9-1290-357-15

TM 9-1290-357-15

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)

AIMING CIRCLE M1, W/E

1290-671-6145

This reprint includes all changes in effect at the time of publication; changes 1 and 2.

HEADQUARTERS, DEPARTMENT OF THE ARMY

MARCH 1970

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TM 9-1290-357-15
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Change No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., *26 April 1973*

Operator's, Organizational, Direct Support, General Support, and Depot Maintenance Manual (Including Repair Parts and Special Tools List)
AIMING CIRCLE M1, W/E (1290-671-6145)

TM 9-1290-357-15, 19 March 1970 is changed as follows:

Page B-4. Section II, basic issue items is superseded as follows:

Section II. BASIC ISSUE ITEMS LIST

(1) Source Maint and Recov Code			(2) Federal Stock No.	(3) Description Reference Number & Mfr. Code — Usable on Code	(4) Unit of Meas	(5) Qty Inc in Unit	(6) Qty Furn With Equip	(7) Illustration	
(a) Source	(b) Maint	(c) Recov						(a) Fig No.	(b) Item No.
P	C		1290-652-8676	CASE, CARRYING: M6A1 6528676 (19200).	ea		1	1-1	
P	C		1290-658-2649	COVER, AIMING CIRCLE: M409 6582317 (19200).	ea		1	1-1	
P	C		1290-652-9317	LIGHT, INSTRUMENT: M2 6529317 (19200).	ea		1	1-1	
P	C		1290-652-8560	TRIPOD: 6528560 (19200)	ea		1	1-1	

Page B-5. Maintenance code—items 2 through 5 are corrected to read C.

Page B-16 Section IV. Maintenance code — items 1 through 3 are corrected to read C.

Page B-17. Maintenance code — item 1 is corrected to read C.

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Official:
VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:
To be distributed in accordance with DA Form 12-41 (qty rqr block No. 3) Operator's Maintenance Requirements for Aiming Circle.

TM 9-1290-357-15
C 2

CHANGE
NO. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC., *27 February, 1974*

Operator's, Organizational, Direct Support, General Support, and Depot Maintenance Manual (Including Repair Parts and Special Tools List) AIMING CIRCLE M1, W/E (1290-671-6145)

TM 9-1290-357-15, 19 March 1970 is changed as follows:

Page i. Change B under appendix A to read as follows:

B. BASIC ISSUE ITEMS LIST AND ITEMS TROOP INSTALLED OR AUTHORIZED LIST AND OPERATOR'S ORGANIZATIONAL, DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST).....B-1

Page 1-1. Paragraph 1-2*b* is superseded as follows:

b. Reporting of Equipment Publication Improvements. The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forwarded direct to Commander, Frankford Arsenal, ATTN: SARFA-MA, Philadelphia, Pennsylvania 19137. A reply will be furnished directly to you.

Page B-1. Appendix B's title is changed as follows:

BASIC ISSUE ITEMS LIST AND ITEMS TROOP INSTALLED OR AUTHORIZED LIST AND OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)

Paragraph B-1 is superseded as follows:

This manual lists basic issue items; repair parts; special tools, and equipment required for the performance of operator's organizational, direct support, general support, and depot maintenance of the aiming circle.

Paragraph B-2 is superseded as follows:

This basic issue items, items troop installed of authorized, repair parts, and special tools list is divided into the following sections.

a. Basic Issue Items List — Section II. A list, in alphabetical sequence, of items which are furnished with and which must be turned in with the end item.

b. Items troop Installed or Authorized List — Section III. Not applicable.

c. Repair Parts — Section III.

d. Special Tools, Test and Support Equipment — Section IV.

e. Federal Stock Number and Reference Number Index — Section V.

Page B-4. Delete items 3 and 4 in the basic Issue items list.

Page B-38. In section V, delete.

Stock Number	*Figure No.*	*Item No.*
1290-652-8560	1-1	
1290-652-9317	1-1	

Page B-39. In section V delete;

Reference No.	*Mfr code*	*Figure No.*	*Item No.*
6528560	19200	1-1	
6529317	19200	1-1	

By Order of the Secretary of the Army:

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Distribution:
To be distributed in accordance with DA Form 12-41 (qty rqr block No. 3) Operator Maintenance Requirements for Aiming Circle.

Technical Manual
No. 9–1290–357–15

HEADQUARTERS,
DEPARTMENT OF THE ARMY
Washington, D.C., *19 March 1970*

OPERATOR'S, ORGANIZATIONAL DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) AIMING CIRCLE M1, W/E 1290–671–6145

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*This manual supersedes those portions of TM 9–1530, 21 March 1950, that pertain to aiming circle M1.

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope

a. These instructions are for use by operator, crew, organization, direct support, general support and depot maintenance personnel. They apply to the aiming circle M1, w/e (1190-671-6145).

b. Appendix A contains a list of current references, including supply and technical manuals, forms and other publications applicable to the aiming circle, M1, w/e.

c. Appendix B contains the list of basic issue items, repair parts list, and special tools that are required for use by operator, organizational, direct support, general support and depot maintenance.

d. Appendix C contains the maintenance allocation chart.

e. The procedures for administrative storage of equipment is contained in chapter 7. A portion of these procedures are in accordance with the requirements of TM 740-90-1.

f. The procedures for destruction of Army materiel to prevent enemy use is contained in chapter 7. A portion of these procedures are in accordance with the requirements of FM 5-25.

1-2. Forms, Records, and Reports

a. Authorized Forms. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by TM 38-750.

b. Recommendations for Maintenance Manual Improvements. The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to DA Publications) and forwarded direct to Commanding Officer, Frankford Arsenal, ATTN: AMSWE-SMF-W3100, Philadelphia, Pa. 19137.

c. Report of Accidents. The necessary reports are prescribed in AR 385-40.

d. Equipment Improvement Recommendations. Use the Equipment Improvement Recommendation section of DA Form 2407.

e. Materiel Failure Report. Failure of materiel will be reported in accordance with TM 38-750.

Section II. DESCRIPTION AND DATA

1-3. Description

a. The aiming circle M1, w/e (fig. 1-1) is a tripod mounted, optical instrument used to orient artillery and infantry weapons by measuring any horizontal angle and limited vertical angles of targets with respect to reference points.

b. Aiming circle M1, (figs. 1-1, 1-2 and 1-3) consists basically of a telescope, elevation and azimuth orienting mechanisms, and magnetic needle assembly. The clamping screw and orienting mechanism knob are used to position the instrument on the tripod with respect to a reference point, without changing azimuth scale settings.

1-4. Telescope Assembly and Elevation Mechanism

a. Telescope assembly. The telescope assembly is a low power optical instrument with an adjustable focusing sleeve for clear definition (figs. 1-2, 1-3 and 1-4). Interposed in the optical system is a vertically and laterally graduated reticle used for direct observation of small angles in elevation and azimuth, and for accurate sighting on an object as required in the determination

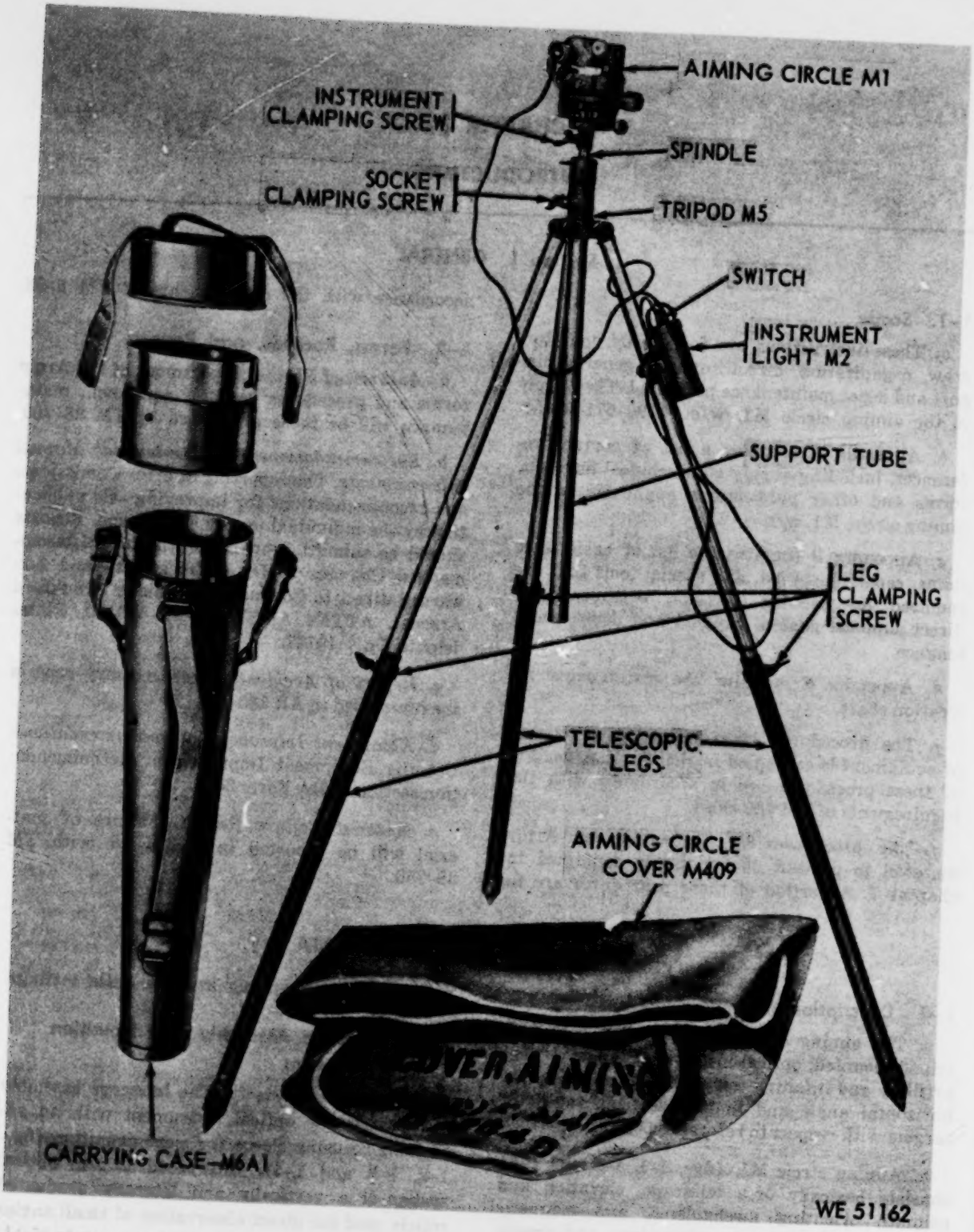

Figure 1-1. Aiming circle M1, with equipment.

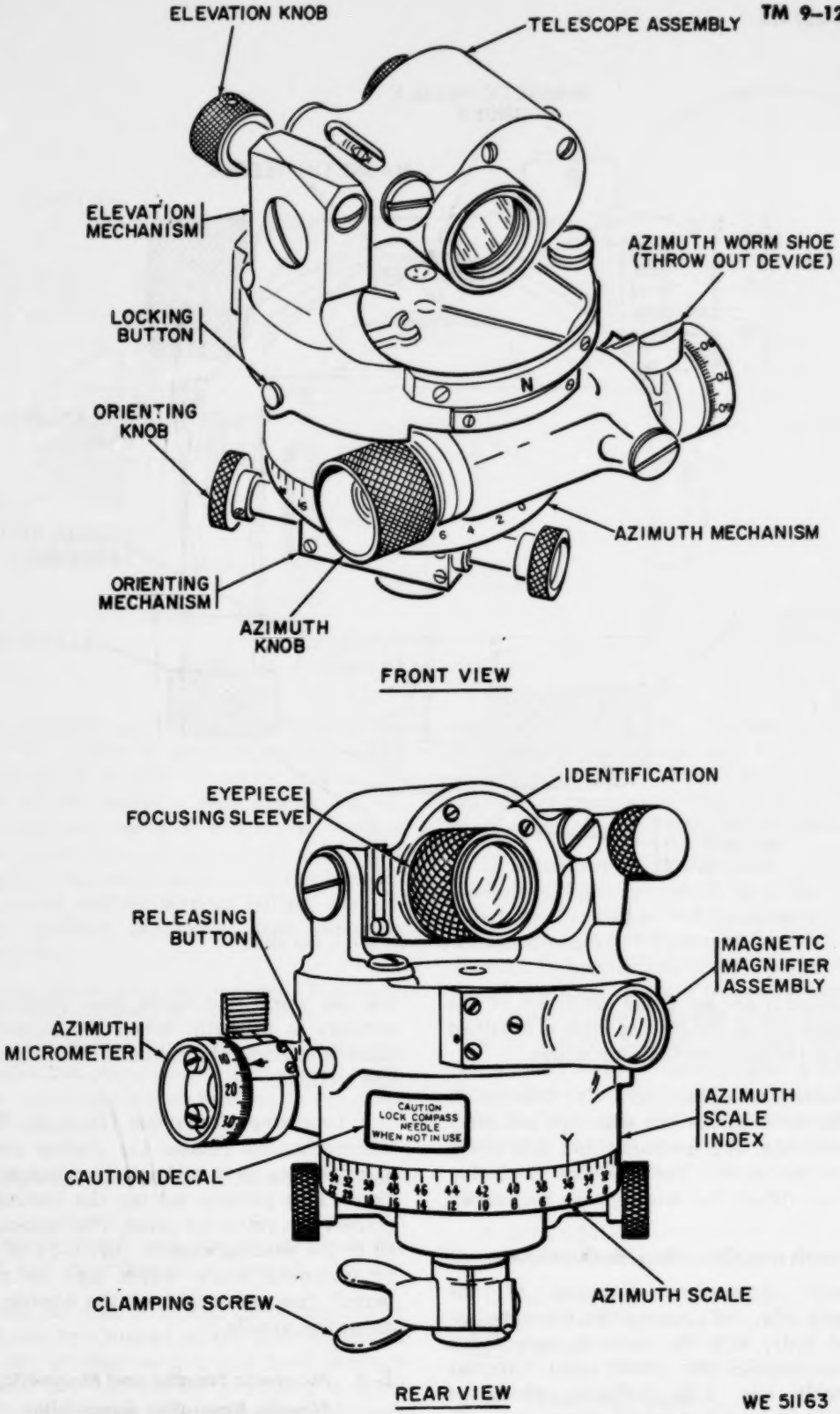

Figure 1-2. Aiming circle M1, - front and rear view.

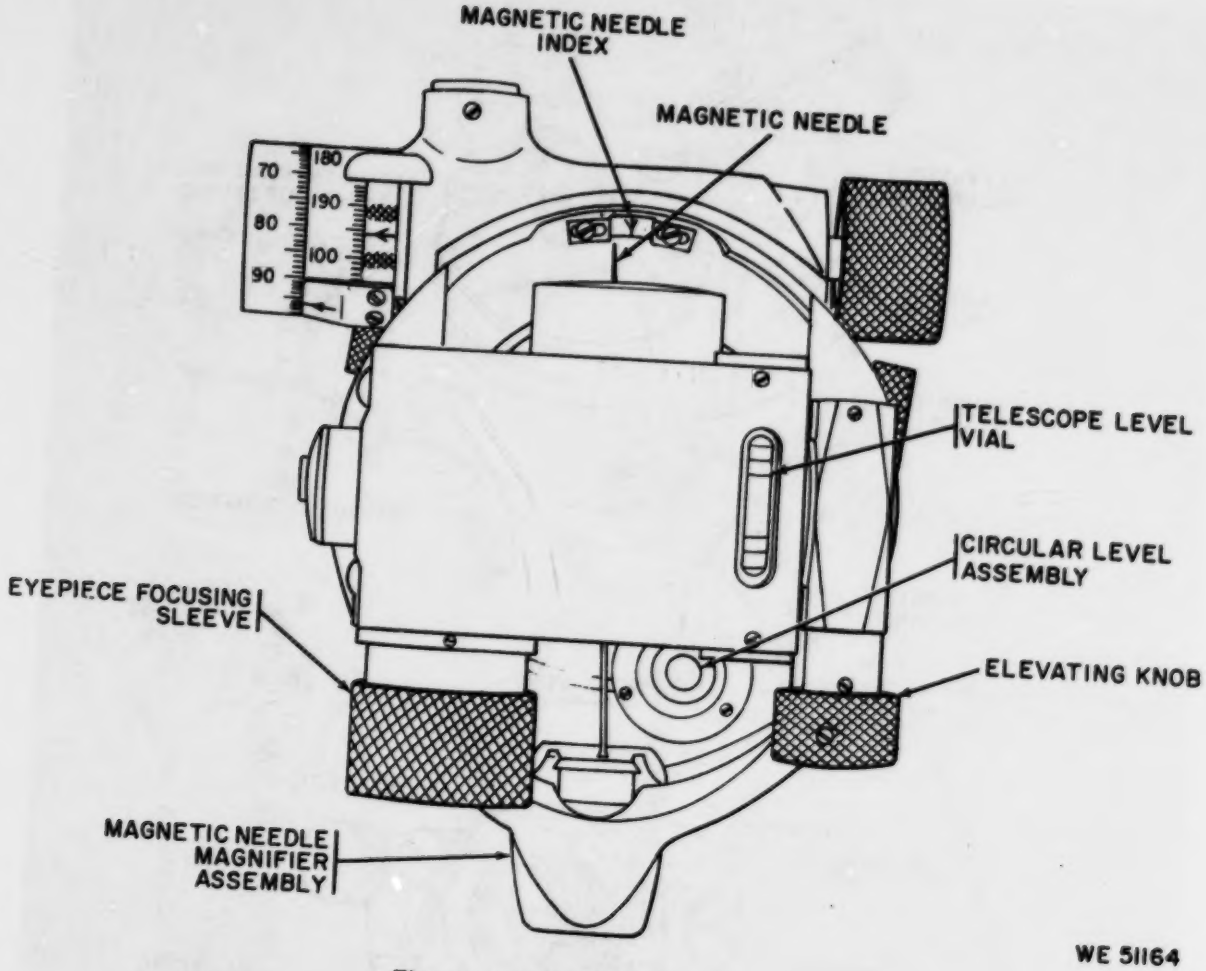

Figure 1–3. Aiming circle M1, – top view.

of larger azimuth angles. Clear definition of the reticle pattern and of the field of view is obtained by rotation of the eyepiece focusing sleeve.

b. Elevation Mechanism (fig. 1–2). Rotation of the elevation knob causes the telescope assembly to rotate vertically, approximately 142 mils above or below the horizontal. The telescope level (fig. 1–3) indicates when the telescope is horizontal.

1–5. Azimuth and Orienting Mechanisms

a. Azimuth Mechanism. Rotation of the azimuth knob (fig. 1–2) causes the telescope assembly and body, with the azimuth scale index to rotate horizontally 360° (6400 mils). Circular level assembly (fig. 1–3) indicates when the azimuth scale is in a horizontal plane. Azimuth worm shoe (throwout device) used for disengaging the worm and worm gear permitting rapid settings in azimuth. When the azimuth mechanism is engaged the azimuth micrometer indicate fine settings.

b. Orienting Mechanism (fig. 1–2). The orienting mechanism rotates the aiming circle M1 in azimuth as a unit without changing scale indications. This permits setting the instrument with respect to a reference point. The housing is clamped to the vertical spindle (fig. 1–1) of the tripod by clamping screw which may be released to permit free movement of the aiming circle M1 about the spindle.

1–6. Magnetic Needle and Magnetic Needle Magnifier Assemblies

a. The magnetic needle assembly (fig. 1–3)

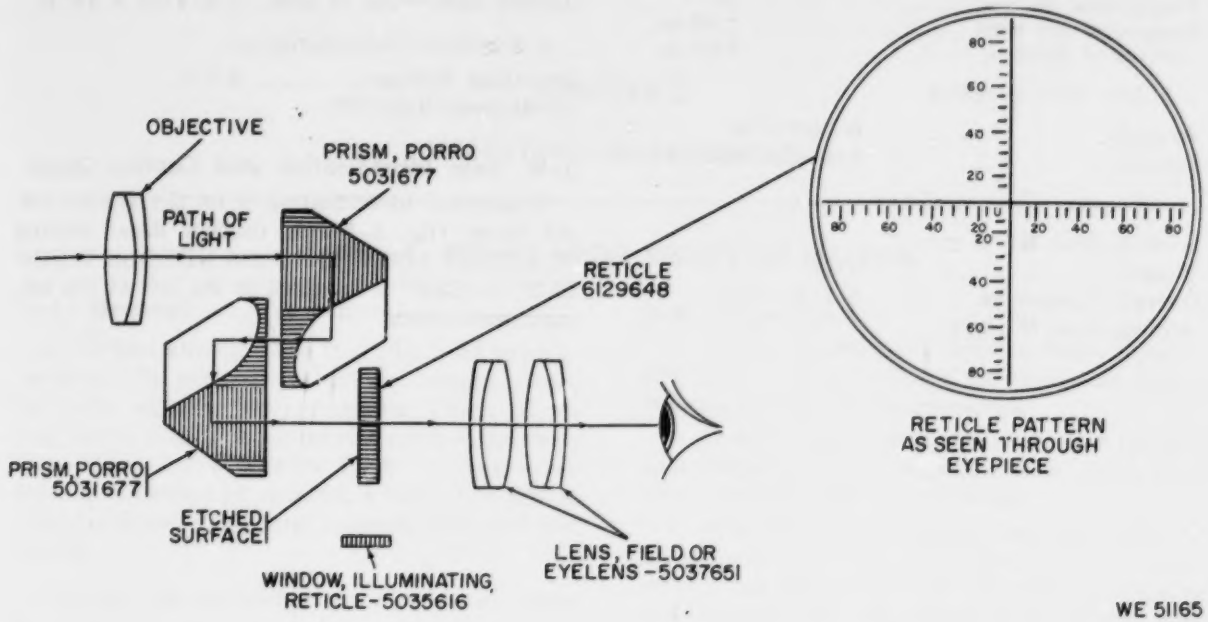

Figure 1-4. Arrangement of optical elements, schematic.

provides a magnetic north direction for orienting purposes. The needle is delicately balanced and jewel mounted on a pivot to rotate freely. The north end of the needle is read against an adjustable index, and the south end is read against a vertical center line, etched on an adjustable needle reticle. The needle can be locked by pushing the red colored locking plunger button, and released by pushing the olive drab releasing plunger button.

Note. Detent actions insure that the needle is either in the clamped position (locked) or fully released.

b. The magnetic needle magnifier assembly (fig. 1-2) includes two plano-convex lenses for viewing the needle reticle and the etched line on the south end of the needle.

1-7. Equipment Issued with Aiming Circle, M1

The equipment issued with the aiming circle M1 are listed and described in *a* through *d* below.

a. Tripod M5 (fig. 1-1) has three telescoping legs, that can be clamped at the desired height. The legs are pivoted on a tripod head through hinges that are adjustable, providing a tight friction fit. A support tube that passes through the tripod head may be clamped to the height desired. The tube has a spindle socket assembly for seating the spindle and forming a ball and socket joint for leveling aiming circle M1. The spindle is clamped in the socket by turning the socket clamping screw.

b. Instrument light M2 (fig. 1-1) is a self contained lighting device used for illuminating the telescope reticle and for general illumination of the circle M1. A flashlight type dry cell battery (which is installed in light's battery case when used) furnishes current to electric lamps through two flexible cords. These cords carry current; one to a lamp bracket assembly and the other to a hand light assembly. The power to these lamps is controlled by an "on" and "off" toggle switch. A thumb nut assembly secures the instrument light to the tripod legs, and the hand light assembly is secured to a clip on the battery case.

c. Aiming circle cover M409 (fig. 1-1) is used to cover the aiming circle M1.

d. Carrying case M6A1 (fig. 1-1) is used for storing the aiming circle M1, w/e and transporting purposes.

1-8. Tabulated Data

a. Optical Characteristics.

Magnification (power)	4 X
Field of view (degrees)	10°
Diameter of exit pupil	0.156 in.
Aperture of objective	0.624 in.

b. Limits of Operation.

Azimuth	0–6400 mils
Elevation	0 to ±142 mils (8°)

c. Physical Characteristics.

Aiming circle M1

Weight	4 lbs
Overall dimensions	5–1/4 × 5 in.

Aiming circle M1, w/e

Weight	21–1/2 lb
Outside dimensions of case	4–3/4 dia × 34" lg

d. Electrical Characteristics.

Operating Voltage (Instrument light M2)	3 Vdc

1–9. Item Identification and Caution Decal

Instrument identification is on the aiming circle cover (fig. 1–1). A caution decal stating "CAUTION LOCK COMPASS NEEDLE WHEN NOT IN USE" is mounted to the left of the azimuth scale index.

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF MATERIEL

2-1. General

a. Inspect aiming circle w/e (fig. 1-1) to make certain it is properly assembled, secure, clean, correctly adjusted and lubricated. Check all repair parts, tools and equipment against the basic issue items list (appendix B) to be sure every item is present and determine that they are in good condition, clean, and properly packaged and stowed.

Caution: **Do not mishandle or abuse the equipment at any time because inaccuracy or breakage will result from mistreatment.**

b. Make a record of any missing parts, tools, and equipment and of any obvious malfunctions. Correct any deficiencies that can be corrected, as quickly as possible.

c. Check all small parts, as they are more likely to become lost and may seriously affect the proper functioning of the materiel.

2-2. Duties

The organizational mechanic performs the inspection to determine whether the materiel has been properly prepared for service and is in condition to perform its assigned mission. It is the duty of the operator to assist the organizational mechanic in the performance of these services.

2-3. Inspection

a. Forms, Records, and Reports. Refer to paragraph 1-2 and appendix A for applicable forms, records, and reports for inspection.

b. Completeness. Inspect the equipment for missing components, screws, nuts, washers, pins, loose rivets, or parts insecurely fastened.

c. Appearance. The appearance will indicate its general condition and reflect type of treatment it has received. Check the legibility of scales and micrometers, and examine for dented surfaces, bent or broken parts, nicks or burrs, fungus growth, moisture and corrosion. Examine for evidence of misuse or damage in shipment which may indicate a need for repair.

d. Functioning of Components. Check that mechanical components operate smoothly without binding, backlash, or rough motion, and that electrical components function normally. Check that stationary and moving parts are free from lint, grit, and other foreign matter which may hamper the aiming circle w/e.

e. Paint and Finish. Inspect for bare spots or damaged finish which exposes bare metal surfaces causing corrosion. Refer to TM 9-213 to determine whether touch-up or complete refinishing is required.

f. Lubrication. Check that materiel is lubricated in accordance with paragraph 3-4.

Section II. CONTROLS AND INDICATORS

2-4. Scope.

This section describes, locates, illustrates, and furnishes the using personnel with sufficient information pertaining to the various controls, indicators, and components provided to insure the proper operation of the aiming circle M1, (figs. 1-2 and 1-3).

2-5. Controls and Indicators

Table 2-1 describes the various controls and indicators used.

Table 2-1. Controls and Indicators

Item	Designation	Function	Reference
1	Eyepiece focusing sleeve.	Focuses clear definition of the reticle pattern and field of view.	Fig. 1-2
2	Elevation knob.	Permits telescope assembly to rotate vertically, approximately 8° (142 mils) above or below the horizontal.	Fig. 1-2
3	Telescope level vial.	Indicates when telescope is level horizontally.	Fig. 1-3
4	Azimuth worm knob and micrometer.	Rotates the telescope assembly and azimuth scale index 360° (6400 mils) for fine adjustments.	Fig. 1-2
5	Circular level assembly.	Indicates when azimuth circle is in a horizontal plane.	Fig. 1-3
6	Azimuth worm shoe (throw-out device).	Disengages the azimuth worm gear allowing rapid approximate settings in azimuth. Coarse adjustment for measuring azimuth. Fine adjustment when azimuth mechanism is engaged.	Fig. 1-2
7	Orienting knob.	Rotates the aiming circle (with the exception of the orienting worm housing) in azimuth.	Fig. 1-2
8	Clamping screw.	Clamps equipment securely.	Fig. 1-2
9	Magnetic needle.	Permits orienting with magnetic north as reference.	Fig. 1-3
10	Magnetic needle magnifier assy.	Magnifies the etched line on south end of needle.	Fig. 1-3
11	RED locking plunger button.	Locks the magnetic needle.	Fig. 1-2
12	OLIVE releasing plunger button.	Releases the magnetic needle.	Fig. 1-2

Section III. OPERATION UNDER USUAL CONDITIONS

2-6. General

This section contains instructions for the proper care of the materiel, preparation for use, and operation of aiming circle M1, w/e (fig. 1-1). For operation under unusual conditions refer to paragraphs 2-9 through 2-13.

2-7. Care in Handling

Aiming circle M1, w/e is, in general, rugged and suited for the purpose for which it was designed, however, it will not stand rough handling or abuse. Inaccuracy or breakage will result from mistreatment. Any instrument that is functioning inaccurately or contains damaged parts must be brought to the attention of the organizational maintenance personnel for disposition. Repair other than those expressly authorized will not be performed by the operator.

a. Unnecessary turning of screws or other part not incident to the use of the instrument is forbidden.

b. Stops are provided on instrument to limit the travel of moving parts.

Caution: **Do not attempt to force the rotation of any knob beyond the stop limit which may damage components or cause malfunctioning of the instrument.**

c. Keep instrument dry as possible. If wet, dry it thoroughly using a clean lint free cloth before storing.

Note. Wipe optical elements with lens paper tissue only.

d. When not in use, keep the instrument covered and protected from dirt, dust, moisture, chipping, scratching and destruction using the provided carrying case M6A1.

e. Do not point instrument directly at the sun, as the heat of the focused rays may damage the optical elements and the eyes.

f. Keep all exposed surfaces clean and dry preventing corrosion, accumulation of dirt of any foreign matter, or etching of optical elements.

g. Check that bubble in circular level vial is centered in any position of azimuth rotation.

h. When using a tripod, spread legs and embed the feet in firm ground. Adjust the extensible legs for length in order to bring the tripod head into an approximately level plane. When adjusting the legs keep the clamping screws lightly loose until tripod has finally been positioned, then tighten them securely.

Caution: **Make certain that clamps are tight, otherwise it may damage equipment.**

2–8. Preparation for Use

a. Remove the carrying case housing the aiming circle M1 w/e from its stowed position.

b. Remove the aiming circle M1 from case and remove cover (fig. 1–1).

c. Fasten the instrument securely on the tripod spindle.

Note. Make certain the tripod feet have been firmly embedded in ground before fastening the instrument.

d. Level the instrument with the tripod ball and socket joint observing the circular level (fig. 1–3, bubble is in center of level).

Caution: **The aiming circle compass cannot be used near steel or iron masses. Such masses will cause inaccurate readings when measuring angles if the compass needle is used as the basis.**

e. Install batteries in battery case of instrument light M2 and install light on tripod (fig. 1–1).

Warning: **When not using instrument remove battery from instrument light M2.**

2–9. General Operation

a. Measuring Horizontal Angles.

(1) Level the instrument as outlined in paragraph 2–7 *c* and *d* above.

(2) With the azimuth knob (fig. 1–2), set the azimuth scale and micrometer at zero.

(3) Using the orienting mechanism clamping screw and orienting knob, (fig. 1–2) adjust the instrument until the vertical centerline of the telescope reticle (fig. 1–4) is on the known point from which the measurement is made. Check level of instrument.

(4) Turn azimuth knob (fig. 1–2) until the verticle centerline of the reticle is on the unknown point to which the measurement is to be made. The azimuth worm shoe (throw-out device) lever may be pushed forward for making azimuth changes rapidly. Observe the azimuth scale, using the main graduations (upper) for values from 3,200 mils and up. Angular indications corresponding to those on panoramic telescopes with 0–3,200 mil scales may be read using the auxiliary (lower) graduations for azimuths from 3,200 mils up.

Caution: **Care must be exercised that clamping screw is tightly secured before turning the telescope by means of the azimuth knob or the azimuth worm shoe (throughout device), and that the position of tripod is not disturbed during the operation of the azimuth knob.**

b. Orientation. By orienting the aiming circle M1, the azimuth scale can be made to read directly in terms of azimuth from north or any other reference direction. The orientation mechanism must not be disturbed after completion of orientation. Any one of the following methods listed in (1) and (2) may be used for orienting:

(1) *Orientation on a datum point of known azimuth.* Set the azimuth scale and micrometer to the known azimuth of the datum point. Position aiming circle M1 until the datum point appears on the crosslines of the reticle, by loosening clamping screw, rotating the instrument for coarse adjustment, tightening clamping screw, and then turning the orienting knob for fine adjustment. The telescope may be elevated or depressed as required to bring the datum point into the field of view.

(2) *Orientation on grid north (Y–north).* Determine the declination constant by setting up the aiming circle over a declination station (any point from which other well defined points of known Y–azimuth can be seen) and carefully level instrument. Set scales at zero and center the magnetic needle. Turn azimuth knob to a point of known azimuth and record this indication. Repeat this process three times subtracting the mean of this indications from the known Y–azimuth (add 6,400 mils to the Y–azimuth, if necessary). The result is the declination constant of the instrument. If more than one point of known Y-azimuth can be seen, repeat the computations for each point and take the mean of the differences as the declination constant on the azimuth scale. Center the needle on the needle index using the orienting

knobs. This orients the zero of the azimuth scale on grid (Y) north. When orientation has been completed, clamp the magnetic needle by depressing red plunger button.

c. Measuring Vertical Angles. Turn elevating knob (fig. 1-3) until the elevation level vial bubble is centered. The angle of elevation of an object is then indicated by its position on the graduations along the vertical cross line of the telescope's reticle.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

2-10. General

In addition to the normal preventive maintenance services (para 3-6 through 3-10), special care must be observed where extremes of temperature, humidity, and atmospheric conditions are present. Proper cleaning and storage not only insure proper operation and functioning, but also guard against excessive wear of the working parts and deterioration of the materiel.

2-11. Operation in Extreme Cold Weather

a. In temperatures below freezing, it is necessary that moving parts be kept absolutely free from moisture.

b. Excessive oil on the working parts will congeal causing sluggish operation and functioning or complete failure. This applies in particular to focusing parts. Special care should be taken to eliminate all excess oil.

c. Do not grasp metal parts, such as levers and knobs with bare hands. Use gloves if possible. Frozen fingers or loss of skin may result if this precaution is not followed.

d. Never breathe on a lens in cold weather. Frost patterns will form obscuring the image, and in extreme cases, may even break the lens.

e. Do not bring any materiel indoors unless it is absolutely necessary. It is best to leave it outdoors, but covered to protect it from the snow. Snowtight lockers which stay at outdoor temperatures are recommended as a place for keeping aiming circle. If it is necessary to bring instruments from low temperatures to room temperatures, "anticondensation" containers should be used. These containers can be specially made boxes or any other reasonably airtight container with heat-conducting walls. Keep them outside so that they will remain at prevailing temperatures until it is desired to bring an instrument indoors. Then put the instrument into the container, close the top, bring it indoors and let it come to room temperature. When the box is at room temperature, it may be opened and the instrument removed without condensation forming on it. If anticondensation chambers are not used and instruments are brought into a heated room, condensation will occur and the instruments will have to be wiped thoroughly dry. Use only lens tissue paper for drying lenses and windows.

f. Inspect instruments frequently. When possible, keep instruments in their cases. To provide maximum protection for the instruments, the following should be strictly observed:

(1) Keep instruments thoroughly clean.

(2) Do not let snow and ice collect on the instruments.

(3) Leave no metal surfaces exposed without a protective film of lubricant.

(4) Never apply heat from strongly concentrated sources directly to an instrument. Sudden changes in temperature will cause optics to break.

2-12. Operation in Extreme Heat

a. Avoid exposing instrument to the direct rays of the sun which may damage the instrument's optics. Provide as much cover or shade as possible.

b. When not in use, cover instrument and stow in the M6A1 carrying case, to protect it from extreme heat.

2-13. Operation Under Dusty or Windy Conditions

a. To protect instrument from damage by direct exposure to the sun, dust, or sand by erecting a vertical barrier (or equivalent).

b. Under extremely dusty or sandy conditions extra care must be exercised when cleaning the instrument to prevent the dust or sand from damaging mechanical components or scratching glass or optical surfaces.

c. When not in use, cover and stow instrument in the M6A1 carrying case making certain that case is free from any foreign matter.

2-14. Operation in High Humidity

a. The instrument should be wiped dry after handling to prevent corrosion or rust.

b. Frequently inspect instrument for rust where humidity is high or a salt air atmosphere prevails. Remove any rust and protect surface with a thin film of oil.

Note. Screws and pins should be lightly oiled to prevent rusting and freezing in place.

c. When not in use cover and stow the instrument in its carrying case.

CHAPTER 3

OPERATOR AND ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. REPAIR PARTS, TOOLS, AND EQUIPMENT

3-1. General

No repair parts, tools, and equipment are issued to the using organization for operating and maintaining the aiming circle M1. Tools and equipment should not be used for purposes other than those prescribed, and when not in use, should be properly stowed.

3-2. Common Tools and Equipment

Standard and commonly used tools and equipment having general application to this materiel are authorized for issue by tables of allowances and tables of organization and equipment.

3-3. Special Tools and Equipment

No special tools and equipment are required at the operator or organizational levels.

Section II. LUBRICATION AND PAINTING

3-4. General Lubrication Instructions

Lubrication of the aiming circle M1 (fig. 1-1) is required and accomplished by coating all bare metal surfaces with a thin film of aircraft instrument oil MIL-L-6085 and lubricating grease MIL-G-32878. Knobs and pivots, not readily lubricated with grease should be oiled with lubricating oil, MIL-L-6085 in order to prevent rusting. Wipe off all excess lubricant with a dry, clean, lint-free cloth to prevent accumulation of dirt, dust, or any other foreign matter. Refer to TM 9-247. Specific instructions for cleaning are contained in paragraphs 3-6 through 3-10.

3-5. Painting

No painting of the aiming circle M1 by using personnel is permitted, except for minor touch up. Care will be exercised to prevent the paint from splashing or covering scales, indices, optics, etc. causing hinderance or improper functioning of the instrument.

Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

3-6. General

Preventive maintenance is the systematic care, inspection, and servicing of equipment to maintain it in serviceable condition, prevent break downs, and assure maximum operational readiness. The operator's role in the performance of preventive maintenance service is:

a. To perform the daily service each day the equipment is operated.

b. To assist the organizational mechanics in the performance of any other scheduled periodic series specified.

c. To assist the organizational mechanic in the lubrication of the instrument.

3-7. Responsibility

Operators and crew chiefs are personally responsible for assigned equipment, squad, section, and platoon leaders are charged with supervisory responsibility for equipment pertaining to their commands. Unit and organization commanders are required to insure that equipment issued or assigned to their commands are properly maintained in a serviceable condition and that they are properly cared for and used.

3-8. Recording Repairs

Repairs accomplished will be in accordance with procedures and standards prescribed in this manual. Deficiencies discovered before, during, and after operation that cannot be corrected by the operator will be entered on DA Form 2404. Deficiencies immediately corrected by the operator are not recorded, except when such corrections are made by replacing parts which constitute repairs above operational level. Such repairs will be recorded as organizational maintenance.

3-9. General Procedures for All Services and Inspections

a. The following general procedures apply to operators (assisting the organizational mechanic) on preventive maintenance services and all inspections.

b. Inspection to see if all items are in good condition, correctly assembled or stowed, secure, not excessively worn, not leaking and adequ .tely lubricated apply to most items in the preventive maintenance and inspection procedures. Any or all of the checks that are pertinent to the aiming circle M1 with equipment (including supporting, attaching or connecting members) will be performed automatically, as general procedures, in addition to any specific procedures given.

(1) Inspection for "good condition" is usually an external visual inspection to determine whether the unit is damaged beyond safe or serviceable limits. Good condition is explained further as meaning: Not bent or twisted, not chafed or burred, not broken or cracked, not bare or frayed, not dented or collapsed, not torn or cut, not deteriorated.

(2) Inspection of unit to see that it is "correctly assembled" or stowed is usually a visual inspection to see if the unit is in its normal position in the equipment and if all parts are present and in their correct relative position.

(3) Inspection of a unit to determine if it is "Secure" is usually an external visual examination or a check by hand for looseness. Such inspection must include any brackets, lockwashers, locknuts or pins.

(4) "Excessively worn" means a unit worn beyond serviceable limits, or to a point likely to result in failure if the unit is not replaced before the next scheduled inspection. Excessive wear of mating parts or linkage connection is usually evidenced by too much backlash or lost motion.

c. Any special cleaning instructions required for the specific mechanisms or parts are contained in the pertinent section.

(1) *Metal parts.* Use dry-cleaning solvent and a clean soft cotton cloth in accordance with instructions in TM 9-247.

3-10. Preventive Maintenance by Operator(s) or Crew(s)

a. Purpose. To assure maximum operational readiness, it is necessary that the equipment be systematically inspected at intervals each day it is operated. Any deficiencies discovered that cannot be corrected by the operator, or corrected by replacing parts, will be reported on DA Form 2404.

b. Daily Preventive Maintenance. Each piece of equipment will be inspected each day it is operated. This service is divided into three parts as indicated in (1) through (3) below.

(1) *Before operation service.* This is a brief service to ascertain that the equipment is ready for operation; it is mainly a check to see if conditions affecting the equipment's readiness have changed since the last after-operation service.

(2) *During-operation service.* This service consists of detecting unsatisfactory performance.

(3) *After-operation service.* This is a basic daily service for the equipment. It consists of correcting, in so far as possible, any operating deficiencies. Thus, aiming circle M1 is prepared to operate upon a moment's notice.

c. Care in Handling Fire Control Equipment.

(1) Exercise care when handling instrument. Do not knock against or drop on a hard surface which may cause inaccuracy, damage, or improper functioning of equipment.

(2) Unnecessary turning of screws or other parts not incident to the instrument is forbidden.

(3) Stops are provided on instruments to limit the travel of moving parts. Do not attempt to force the rotation of any knob beyond the stop limit.

(4) Keep instrument as clean and dry as possible, especially before storing or placing in its carrying case.

(5) When not in use, lock the needle, keep instrument covered and in its carrying case to protect it from dust, moisture, and any other foreign matter.

(6) To prevent excessive damage and wear of threads, never tighten leveling screws, clamping screws, etc., beyond a snug fit or their capable limits. The azimuth worm shoe throwout device should be used carefully to avoid damaging the worm.

(7) Any instrument which cannot be adjusted or corrected by the authorized procedure must be brought to the attention of responsible personnel.

d. Preventive Maintenance Checks and Services. Table 3-1 lists the schedule for preventive maintenance checks and services which will be performed at the designated intervals; however, these services will also apply to organizational, direct support, general support, and depot maintenance personnel who may have the occasion to use, stow, package or ship the equipment.

Table 3-1. Preventive Maintenance Checks and Services.

Item no.	Internal						B—Before Operation D—During Operation	A—After Operation W—Weekly	M—Monthly Q—Quarterly
	Operator				Org				
	Daily								
	B	D	A	W	M	Q	Item to be inspected	Procedure	Reference
1	X			X			Aiming circle M1, exterior surface.	Clean and wipe dry.	Para 2-7
2	X			X			Exposed mechanical components.	Tighten external screws or nuts. Report missing parts.	------
3					X		Azimuth and orienting mechanisms.	Traverse instrument 6400 mils in azimuth using orienting and azimuth knobs. *Note. If there is any binding or sticking, disassembly and repair will be required.*	------
4					X		Elevation mechanism.	Elevate and depress telescope. *Note. If there is any binding in mechanism as knob is rotated, or if pressure is not exerted by the compression spring, disassembly and repair will be required.*	------
5					X		Optics.	Point optics skyward or at a bright light, looking through the objective end for dirt, smears, fungus growth, scratches, digs, condensation, chips, fractures or cement separations. *Note. If defects are sufficient to interfere with the use of the instrument, disassembly and repair will be required.*	Para 2-7
6					X		Circular level vial.	Check accuracy by rotating the leveled instrument slowly through a full turning azimuth. The bubble should remain centered at any position in azimuth. *Note. If bubble does not remain centered, level vial should be replaced.*	Para 2-7
7					X		Azimuth scale and micrometer.	Check simultaneous readings of scale and micrometer zeros. *Note. If micrometer does not indicate zero when scales do, loosen clamping screws or*	Para 2-9

Table 3-1. Preventive Maintenance Checks and Services—Continued

Item no.	Internal						B—Before Operation D—During Operation	A—After Operation W—Weekly	M—Monthly Q—Quarterly
	Operator				Org				
	Daily				*				
	B	D	A	W	M	Q	Item to be inspected	Procedure	Reference
								nuts on micrometer knob and while holding the knob to prevent the scale from moving off its index, slip micrometer to read zero. Tighten clamping screws or nut. Check zero reading with scale again repeat if necessary.	
8					X		Magnetic needle reticle.	Inspect for scratches, dirt, and chips.	------
9					X		Magnetic needle balance.	Place instrument on a level surface away from iron or steel objects. Both ends of the needle should be the same distance away from the glass.	------
10					X		Magnetic needle polarity.	Place instrument on a level surface away from iron or steel objects. The north seeking end of the needle should point to the north.	------
11					X		Magnetic needle pivot.	Place instrument on a level surface. Displace needle by passing an iron or steel object across the path of the needle. If needle does not swing freely and come to rest on the same reference line in 4 seconds notify direct support maintenance personnel.	------
12		X					Carrying case.	Clean exterior and interior periodically by brushing or compressed air to remove any foreign matter.	------
13	X						Instrument light M2.	Check for proper illumination, lamps, switch, and battery and replace if necessary.	Para 3-14c
14	X	X					Tripod, bail and joint.	Clean. Oil ball and socket joint. *Note. Do not disassemble the joint. Use only lubricating type oil.*	------
15				X			Tripod.	Check legs and support for bends, nicks and dents. Center sections should move freely up and down and should clamp rigidly in any desired position when released. Sufficient friction should be present to allow adjustment of aiming circle without falling. *Note. Dissembly or repair will be required if any of the above conditions are not satisfied.*	------

Section IV. TROUBLESHOOTING

3-11. Scope

Troubleshooting is a systematic isolation and remedy of malfunctions and defective components by means of symptoms and tests. The tests and remedies provided in this section are to be performed by the operator, organizational and direct support maintenance personnel. Tests and remedies not listed in this section are to be performed by general support and depot maintenance personnel.

3-12. Procedure

The troubleshooting procedure described in table 3-2 is one of determining malfunctions, their probable causes, and the necessary corrective action required to remedy the malfunction. Corrective action that is beyond the scope of the operator will be taken by the organizational, direct support, general support or depot maintenance personnel.

Table 3-2. Troubleshooting

Item No.	Malfunction	Probable cause	Corrective action
1	Failure to illuminate.	a. Lamp burned out.	a. Replace lamp. (paras 5-25 and 5-32)
		b. Defective battery.	b. Replace battery. (paras 5-25 and 5-32)
		c. Defective switch.	c. Replace switch. (paras 5-25 and 5-32)
2	Poor vision.	a. Dirt, dust, or fingerprints on windows or eyepiece optics.	a. Clean with lens paper tissue.
		b. Condensation on entrance window or eyepiece optics.	b. Allow instrument to reach ambient temperature.
		c. Damage or broken window or optics.	c. Notify direct support maintenance personnel.
3	Controls not functioning properly.	a. Binding and/or a rough motion when operating controls.	a. Notify direct support personnel.
		b. Defective or broken components.	

Section V. REPAIR OF AIMING CIRCLE M1

3-13. General

This section contains general and specific organizational maintenance instructions for the repair of the major item. Specific repairs and inspections within the scope of the organizational level of maintenance are described in order to restore the major item to a serviceable condition.

3-14. Maintenance

a. Cleaning.

(1) *Metal parts.* Use dry cleaning solvent or volatile mineral spirits (and a clean soft lint-free cloth) to clean metal parts in accordance with instruction in TM 9-247.

(2) *Rubber or plastic parts.* Clean rubber and plastic parts with soap and warm water.

(3) *Optical surfaces.*

(*a*) To remove dust, dirt, lint and any foreign matter from surface brush lightly with a clean camel's hair artist brush then tap handle against a hard surface to knock out small particles which may have clung to the hairs of the brush. Repeat this frequently.

Caution: **Under no circumstances use polishing liquids, pastes, or abrasives when cleaning plastic, glass, or optical surfaces.**

(*b*) After surface has been cleaned wipe surface with a lens paper tissue.

(*c*) Moisture due to condensation may collect on the optical surfaces when the temperature is lower than that of the atmosphere. This moisture, if not excessive, can be removed by placing the instrument in a warm place.

Cauton: **Do not place the instrument directly**

in a heated strongly concentrated source which will cause inaccuracy, malfunction, or damage to the instrument.

b. General Precautions in Cleaning.

(1) Dry-cleaning solvent and volatile mineral spirits are inflammable and should not be used near an open flame. Fire extinguishers should be provided when using these materiels. Use only in well-ventilated places.

(2) These cleaners evaporate quickly and have a drying effect on the skin. If used without gloves, they may cause cracks in the skin, and, in the case of some individuals, mild irritation or inflammation.

(3) Exercise care when cleaning, insuring complete removal of all residue or sediment, which may hamper, damage, or cause improper operation of equipment.

(4) The use of diesel fuel oil, gasoline, benzene (benzol) or carbon tetrachloride for cleaning is prohibited.

c. Replacement of Instrument Light M2 Lamps and Battery.

(1) If lamps (fig. 1-1) are defective, remove and discard lamps.

(2) Replace old lamps with new ones.

(3) If battery is defective remove and discard.

(4) Replace old battery with a new one.

(5) Check that instrument light functions properly (light will illuminate).

CHAPTER 4

DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE INSTRUCTIONS

Section I. GENERAL

4-1. Scope

This chapter contains special tools and equipment, improvised tools, repair parts, detailed instructions for inspection, troubleshooting, and removal and installation of major components and auxiliaries in direct support, general support and depot maintenance shops.

4-2. Forms, Records and Reports

Forms, records and reports are contained in paragraph 1-2.

Section II. DESCRIPTION AND DATA

4-3. Description and Tabulated Data

For a complete description and tabulated data of the aiming circle M1 w/e refer to paragraphs 1-3 through 1-9.

Section III. REPAIR PARTS, SPECIAL TOOLS, AND EQUIPMENT

4-4. Scope

This section consists of tools and equipment that are issued to direct support, general support and depot organizations for maintaining the aiming circle, M1. Tools and equipment should not be used for purposes other than prescribed and, when not in use, should be properly stored.

4-5. Common Tools and Equipment

Standard and commonly used tools and equipment having general application to this materiel are authorized by tables of allowances and tables of organization and equipment.

4-6. Special Tools, Equipment and Fixtures

The specials tools, equipment, and fixtures listed in table 4-1 are designed for use with the aiming circle M1.

Note. The improvised tools listed in table 4-1 apply only to general support and direct support organizations performing the associated maintenance of the aiming circle, M1.

Table 4-1. Special Tools, Equipment, and Fixtures

Item	Identifying number	References		Use
		Fig.	Para	
COLLIMATOR 18-C-1279-50	1290-757-3291	4-1 4-3	5-49	Used as an indoor target during tests and adjustments.
DIOPTOMETER 7680631	4931-536-5557	4-2	5-52	Used as an aid when checking optical performance.
FIXTURE, azimuth testing 7691596	4931-769-1596	4-3	5-49	Used for tests and adjustments of aiming circle.

Table 4-1. Special Tools, Equipment, and Fixtures—Continued

Item	Identifying number	References		Use
		Fig.	Para	
HOLDER, telescope, collimating 4-H-2374-125	4931-612-1110	4-4	5-49	To hold collimating telesco 18-T-540-250 during set up of azimuth test fixtu 4931-769-1596.
TELESCOPE, collimating 18-T-540-250	4931-554-9108	4-5	5-49	Used with collimating tele scope holder during setu of azimuth test fixture 4931-769-1596. Also can be used in place of dioptometer 4931-536-555
TESTER, universal vibration 7560085	4931-536-5555	4-6	5-50	To simulate conditions of shock and handling the aiming circle could recei during normal use.
SCREWDRIVER, special, offset, aiming circle, length 3 inches	5120-757-5874	4-7		For telescope bracket screws 5305-550-3844.
WRENCH, spanner face, 0.07 dia pin, No. 2	5120-595-8996	4-7		Orienting worm ball cap 1290-513-2032.
WRENCH, tubular, dble-end, concave inserted blade, size 0.500 and 0.516 in. (1/2 and 33/64 in.)	5120-345-1381	4-7		Magnifier cell assembly 1290-613-5660.
WRENCH, tubular size 0.594 and 0.609 in. (19/32 and 39/64 in.)	5120-345-1384	4-7		Reticle retaining ring 5039586.
WRENCH, tubular size 0.719 and 0.734 in. (23/32 and 47/64 in.)	5120-345-1388	4-7		Reticle cell, eyepiece retaining ring and objective cell.
WRENCH, tubular size 0.906 and 0.922 in. (29/32 and 59/64 in.)	5120-345-1393	4-7		Adapter retaining ring.

4-7. Collimator

a. General. The collimator (fig. 4-1) is an optical device similar to an ordinary straight tube telescope except that it does not require an erecting system. When in use, it is sighted into through the objective end instead of the eyepiece end. The collimator serves as a convenient indoor testing target in the adjustment and inspection of aiming circle M1. The target it provides is always uniform as far as intensity of illumination and clarity of the image.

b. Detailed Description. The collimator is a telescope with its eyepiece end machined to accommodate a lamp housing (fig. 4-1) which is provided with a clamping screw so that it m be secured to the collimator. The lamp housi is equipped with a 7 1/2-watt lamp assemb and an extension cord with a plug and swit for use with a 110-volt source of current th provides illumination for the collimator. The c limator contains a reticle of which the retic pattern is graduated in mils, and the 1-mil tole ance can be accurately made. Smaller toleranc can easily be estimated. Resolution marks on t reticle are provided to aid when checking defin tion of the aiming circle's optical system. Th positioning of the objective lens of the collimat is controlled by the adjustable objective sca (fig. 4-1). This knurled scale is graduated

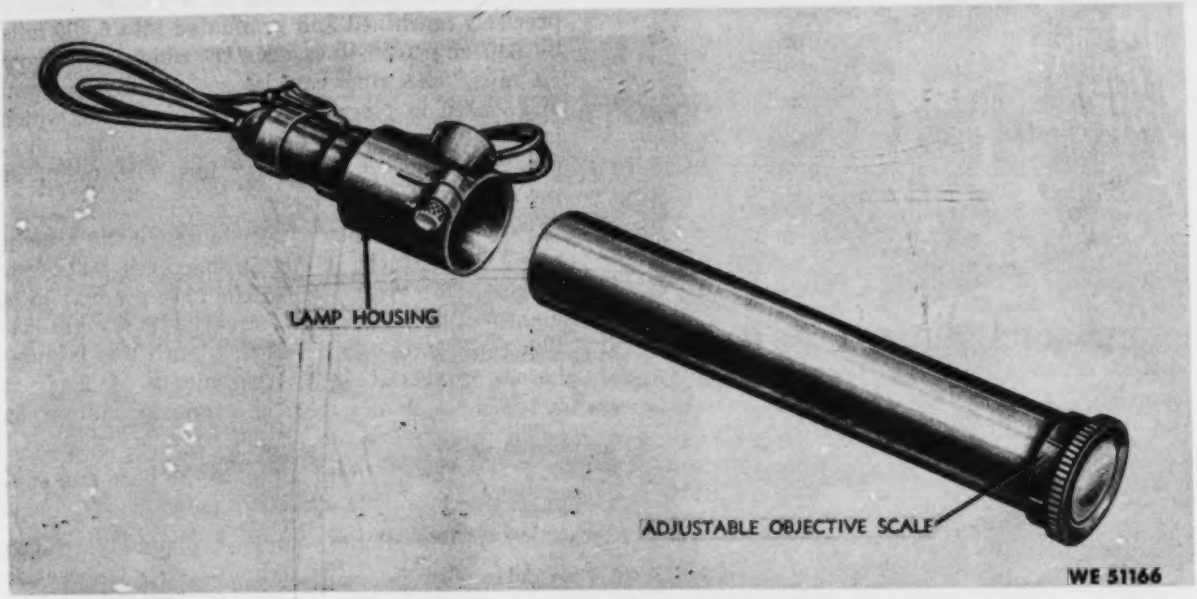

Figure 4-1. Collimator – exploded view.

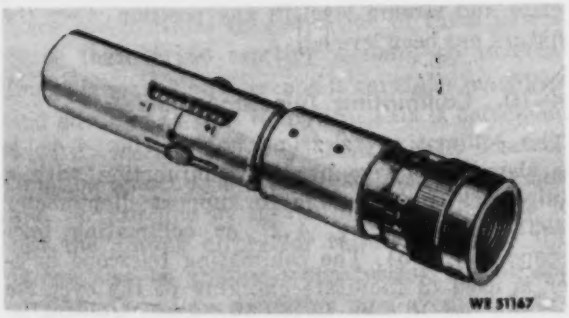

Figure 4-2. Dioptometer

that the objective can be accurately positioned, setting the collimator at the parallax distance required for the aiming circle telescope. The scale is graduated with an infinity mark, and four other marks representing 500, 200, 100, and 75 yards.

4-8. Dioptometer

The dioptometer (fig. 4-2) is a small calibrated collimating telescope. It contains a conventional-type focusing eyepiece with an attached diopter scale, a stationary reticle pattern consisting of two lines crossing each other at right angles, and an adjustable objective with a diopter scale and attached index. The eyepiece diopter scale is graduated from +4 to −4 diopters and the objective scale is graduated from + to −1 diopter. The eyepiece scale is used in conjunction with the objective scale to determine focus and parallax readings of the aiming circle.

Figure 4-3. Azimuth testing fixture

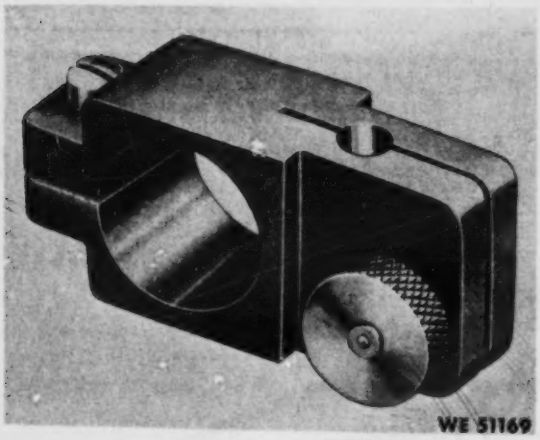

Figure 4-4. Collimating telescope holder

Figure 4-5. Collimating telescope

4-9. Azimuth Test Fixture

a. General. The azimuth test fixture (fig. 4-3), when used with the azimuth test fixture adapter 7681311 and the collimator 1290-757-3291 (fig. 4-1), is a mechanical device for checking the accuracy of all azimuth movements and scale and micrometer settings of the aiming circle.

b. Detailed Description. This fixture, when used to adjust and inspect the aiming circle, consists mainly of seven basic components; the base, the azimuth ring, the vernier scale, the adapter support plate, the column, the collimator 1290-757-3291 and the azimuth test fixture adapter 7681311.

(1) The base is an aluminum casting having three leveling screws. It mounts and supports the other components of the fixture mentioned above.

(2) The azimuth ring is a bronze casting precisely machined and graduated into 6,400 mils by 640 engraved lines each of which represents 10 mils. The ring can be set at any position and locked in place with a clamping arm, which is mounted under the base. A spring-loaded plunger and screw provides for fine adjustment of the ring.

(3) The vernier scale mounts on the base in a machined track. It has an engraved scale consisting of 51 graduations. The first graduation is identified by a "0" and thereafter every graduation represents 0.2 mil. Every tenth line is numbered progressively by increments of 2, from 0 to 10. It is possible to estimate readings as small as 0.1 mil on the vernier scale.

(4) The column clamps to the base and supports the collimator.

(5) The adapter support plate is fastened to the spindle of the azimuth ring, concentric to the ring. A machined surface, perpendicular to the axis of the spindle, provides the mounting surface for the azimuth test fixture adapter. Three cam-head screws in the plate permit easy clamping of the adapter on this surface. The adapter is machined so it will fit onto the support plate and remain level in any position when the fixture has been leveled.

4-10. Collimating Telescope Holder

The collimating telescope holder (fig. 4-4) is a clamping device used in conjunction with a universal surface gage to support dioptometer 4931-536-5557 (fig. 4-2) or collimating telescope (fig. 4-5). The collimating telescope holder is used to facilitate checking of the eyepiece setting, reticle and image tilt, and definition of the aiming circle.

4-11. Collimating Telescope

a. General. The collimating telescope (fig. 4-5) is a small straight tube telescope whose outside surface is carefully machined to provide a bearing surface so that its optical and mechanical axis may be alined. The optical axis is adjusted to coincide with its geometric axis, this telescope can be used to establish a line-of-sight to a distant target that is coincident to a line determined by mechanical means.

b. Detailed Description. The collimating telescope contains an objective lens, reticle, and eye-

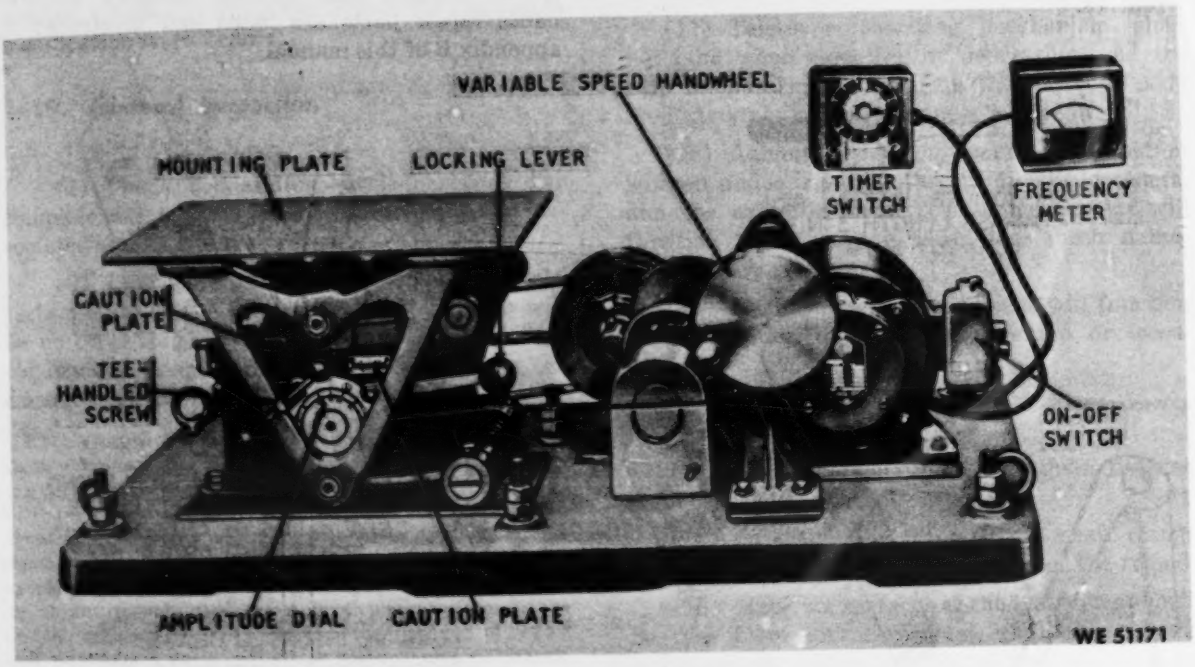

Figure 4–6. Universal vibration tester

piece and provides magnification of three power. Since there is no erecting system, an inverted image is seen. The telescope is carefully machined and adjusted so that its optical axis is coincident with its mechanical or geometric axis. The collimating telescope is used to establish a horizontal and vertical line by means of its own reticle to test the aiming circle for reticle or image tilt. It can also be applied when testing the aiming circle for parallax, definition, and eyepiece focus.

4–12. Universal Vibration Tester

a. General. The universal vibration tester (fig. 4–6) is a motor-driven vibrator which uses the vibration tester adapter to mount the aiming circle. It is used to simulate conditions of shock and handling that the aiming circle would normally encounter during its use. Through its use, loose dirt and improperly secured components which would effect the efficient operation of the aiming circle and revealed.

b. Detailed Description. Amplitude and frequency of the vibrator and adjusted as required by the specifications of the aiming circle. Frequency of vibration is controlled by adjusting the rotation speed of the tester, as indicated on the frequency meter (fig. 4–6). This is accomplished by adjustment of the belt-driven variable-speed pulley by means of the variable-speed handwheel. Amplitude is adjusted by the tee-handled screw at the side of the vibrator. Refer to instruction and caution plates attached to the vibration tester. A timer switch, wired into the electrical circuits, is preset for the time of vibration required.

4–13. Adjustable Face Spanner and Tubular Wrenches

a. The adjustable face spanner (fig. 4–7) and the tubular wrenches required for disassembly and assembly of the aiming circle and its equipment are identified in table 4–1.

b. The tubular wrenches are used for removing and installing the cells and retaining rings of the aiming circle which are slotted to receive the lugs of the wrenches. Each wrench has three pairs of 1/4-inch holes for the application of a suitable bar for use in turning.

c. The adjustable face spanner wrenches are used to remove those rings, plugs, and covers which are drilled to receive the pins of the wrenches.

4-14. Direct Support and General Support and Depot Maintenance Repair Par

Direct support and general support maint nance repair parts are listed and illustrated appendix B of this manual.

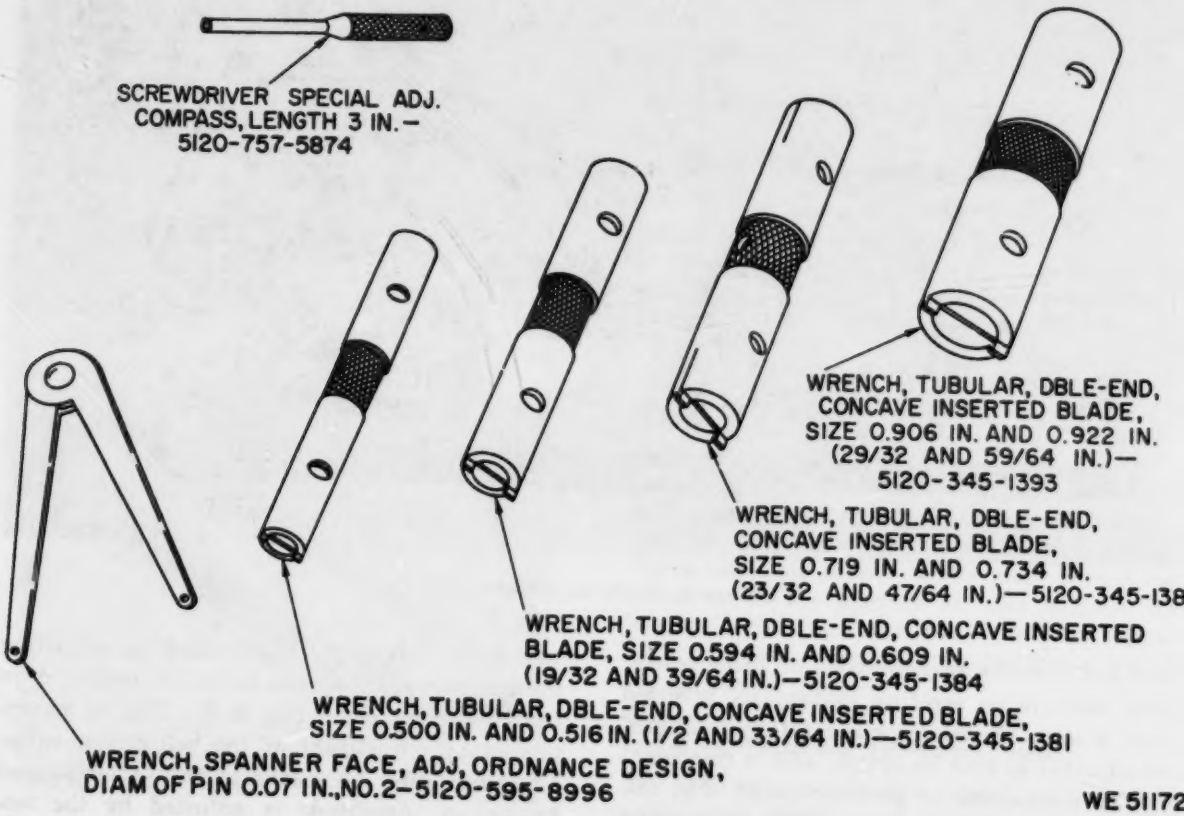
SCREWDRIVER SPECIAL ADJ. COMPASS, LENGTH 3 IN.— 5120-757-5874
WRENCH, TUBULAR, DBLE-END, CONCAVE INSERTED BLADE, SIZE 0.906 IN. AND 0.922 IN. (29/32 AND 59/64 IN.)— 5120-345-1393
WRENCH, TUBULAR, DBLE-END, CONCAVE INSERTED BLADE, SIZE 0.719 IN. AND 0.734 IN. (23/32 AND 47/64 IN.)—5120-345-138
WRENCH, TUBULAR, DBLE-END, CONCAVE INSERTED BLADE, SIZE 0.594 IN. AND 0.609 IN. (19/32 AND 39/64 IN.)—5120-345-1384
WRENCH, TUBULAR, DBLE-END, CONCAVE INSERTED BLADE, SIZE 0.500 IN. AND 0.516 IN. (1/2 AND 33/64 IN.)—5120-345-1381
WRENCH, SPANNER FACE, ADJ, ORDNANCE DESIGN, DIAM OF PIN 0.07 IN.,NO.2—5120-595-8996
WE 51172

Figure 4-7. Screwdriver and wrenches

Section IV. INSPECTION

4-15. Scope

This section sets forth inspection of the aiming circle, M1 in the using position and in maintenance shops.

4-16. Purpose

Inspection is performed primarily (1) to determine completeness, (2) to determine the nature of unserviceability, (3) to determine the work, repair parts, and supplies required to return the materiel to serviceability, (4) to insure that work in process is being performed properly, and (5) to insure that completed work complies fully with serviceability standard.

4-17. Inspection in the Using Position

a. General. In general, the aiming circle M1 will be considered serviceable if it is complete and all deficiencies have been corrected ensuring operation in accordance with serviceability standards.

b. Using Position. Inspection in the using position refers to the inspection performed by maintenance personnel when aiming circle M1 is mounted in position on the tripod M5.

4-18. Modification Work Orders (MWO)

All applicable modification work orders will be applied. Check DA Pamphlet 310-7, for applicable modification work orders.

4-19. General Inspection

a. Aiming Circle M1.

(1) Check the aiming circle carefully for completeness to be sure all components and associated equipment are present.

(2) Looking through the eyepiece and objective ends of the telescope assembly there will be no objectionable dirt, smears, scratches, digs, condensate, fungus growth, chips, fractures, or cement separations.

Note. Optical instruments will not be rejected for defects which can only be detected by the shading or shadowing technique. When inspecting through the eyepiece end of the telescope assembly, rejection is to be based only on those defects which are apparent when field conditions exist. "Shadowing" is the technique of looking into the eyepiece or objective end of the instrument obliquely so as to obtain reflections from a particular surface in the optical system. With this method, the surfaces of lenses and reticles are dark gray in appearance and all defects (condensate, scratches, etc.) show up as white particles.

(3) Looking through the magnetic needle magnifier there will be no objectionable dirt, smears, scratches, etc. or foreign matter.

(4) Magnetic needle magnifier assembly will be securely sealed and fastened to the aiming circle body.

(5) Check that magnetic needle window is free from breaks, cracks, chips, or any other foreign matter.

(6) Silver plating on the interior surfaces of the aiming circle body will be in good condition having no appreciable peeling or deterioration.

(7) Magnetic needle locking and release mechanism which is operated by the red (locking) and olive drab (releasing) buttons will function properly for locking and releasing of the magnetic needle. Needle will operate freely when in the released position.

(8) Telescope body level vial and circular level vial will be free from cracks, and securely mounted.

(9) Reticle illuminating window will not be broken and will be securely sealed and fastened in the body of the telescope assembly. Instrument light dovetail slot will be free from nicks, burrs or paint.

(10) Eyepiece focusing sleeve movement will function without undue irregularities, friction, or looseness.

(11) Telescope elevating mechanism shall not bind when elevating or depressing, and the stop mechanism will restrain the telescope body from striking the magnetic needle window.

(12) Azimuth worm movement will function without undue irregularities, friction or looseness, and the azimuth worm release mechanism will function to return the worm into mesh immediately upon releasing.

(13) Orienting worm movement will function without undue irregularities, friction or looseness.

Note. Orienting worm movement will be considerably tighter than azimuth worm movement.

(14) Scales, graduations, and their indexes shall be clearly legible.

(15) Orienting clamping screw shall clamp aiming circle to the vertical spindle of the tripod.

(16) Exterior surfaces of the instrument shall be free from corrosion, rust, chipped or loose paint and other objectionable matter.

(17) Sealing of the telescope body and magnetic needle window shall not be deteriorated which may cause apparent leaks or openings.

b. Tripod M5.

(1) Tripod's vertical spindle shall be free of burrs or other foreign matter that would interfere with the proper seating of the aiming circle.

(2) When the aiming circle is mounted on the tripod, the ball and socket clamp shall operate to lock tripod's vertical tube at any desired height.

(3) Tripod telescoping legs shall have a smooth movement when adjusting legs up or down and hold their position when clamped in position.

(4) Tripod surfaces will be free of corrosion, chipped or loose paint, or any other objectionable matter which may hamper or cause tripod to operate inefficiently or not at all.

c. Instrument Light M2. Check instrument light for completeness, operation of switch and lamp, and condition of wiring. Check case housing and parts to determine that they are not dented, bent or twisted. Metal components shall be free of corrosion, rust, loose paint, or other objectionable material.

d. Aiming Circle Cover M409. Check that the

canvas cover is free of mold, breaks, tears, loose stitching, etc.

e. Carrying Case M6A1.

(1) All leather, canvas, metal, and wood components shall be free from mold, breaks, tears, loose stitching, rust, defective snaps or buckles, and any other objectionable material.

(2) The carrying case shall not be damaged in any manner which would prevent the tripod, aiming circle, lamp, batteries, and instrument light from being securely supported in their respective compartments without damage.

(3) Carrying case surfaces will be free from corrosion, rust, chipped or loose paint, or an other objectionable material.

4–20. Performance Test

Refer to paragraphs 2–8 and 2–9.

4–21. Shop Inspection

a. The following sets forth the procedure t be followed by direct support and general su port maintenance shops in performing inspectio of the aiming circle turned into the shops fo repair.

b. Determine if the repair is within the scop of the maintenance shop (refer to paragraph 4–2 4–23, 5–5 and 5–6).

Section V. TROUBLESHOOTING

4–22. Purpose

Troubleshooting is a systematic isolation and remedy of malfunctions and defective components by means of symptoms and tests. Close adherence to the procedure covered herein will materially reduce the time required to locate trouble and restore the equipment to normal operation.

Caution: **Operation of the materiel without a preliminary examination can cause further damage to faulty components. Exercise care durin troubleshooting to avoid further damage.**

4–23. General

For troubleshooting procedures performed at a organizational level refer to paragraph 3–11. The troubleshooting procedure described in tab 4–2 is one of determining malfunctions, the probable causes; then, taking necessary correc ive action to remedy the malfunction.

Table 4–2. Troubleshooting

Item No.	Malfunction	Probable cause	Corrective action
1.	Failure of instrument light M2 reticle light or hand light to illuminate.	a. Dirt, corrosion, etc. on lamp contact. Lamp not properly installed or burned out.	a. Clean lamp contact and install lamp properly. Replace lamp if burned out (paras 5–25 and 5–30).
		b. Weak or dead battery.	b. Weak battery. Replace battery if weak or burned out. (paras 5–25 and 5–32).
		c. Battery cap corroded, weak tension spring, etc.	c. Clean spring and cap. Replace weak spring. (paras 5–25 and 5–30).
		d. Corroded battery	d. Clean contacts (paras 5–25 and 5–30).
		e. Open circuit or short in switch.	e. Repair or replace switch.
		f. Defective wiring.	f. Replace wiring (paras 5–25 and 5–32).
2.	Failure of visual indication by the telescope level vial.	Foggy, cracked, or broken vial.	Replace vial. (paras 5–18 and 5–39).

Table 4-2. Troubleshooting—Continued

Item No.	Malfunction	Probable cause	Corrective action
3.	Failure of visual indication by the circular level vial.	Foggy, cracked, or broken vial.	Replace vial. (paras 5-12 and 5-44).
4.	Telescope reticle does not become illuminated when a beam of light is directed into the reticle.	Dirty, improperly positioned, or defective reticle.	Clean, adjust, or replace reticle (paras 5-21 and 5-36).
5.	Parallax in optical system.	Objective lens incorrectly positioned in relation to the reticle.	Adjust objective in cell assembly, (paras 5-22 and 5-35).
6.	Poor definition of the telescope reticle.	a. Eyepiece lens cell out of adjustment in relation to the reticle.	a. Adjust eyepiece focusing sleeve.
		b. Defective eyepiece assembly component.	b. Replace defective component. (paras 5-19 and 5-38).
		c. Reticle not properly installed.	c. Install reticle properly. (para 5-36).
7.	Poor image definition.	a. Defective objective lens.	a. Replace objective lens. (para 5-22).
		b. Incorrect eyepiece, focusing.	b. Adjust focusing sleeve.
		c. Parallax in system.	c. Adjust objective cell assembly (para 5-35).
		d. Improperly installed or defective porro prism.	d. Install prism properly or replace prism. (paras 5-18 and 5-39).
8.	Tilt of reticle.	Improper installation of the reticle or loose components.	Install the reticle properly and tighten the loose component. (para 5-36).

CHAPTER 5

REPAIR INSTRUCTIONS

Section I. GENERAL

5-1. Scope

This chapter contains detailed instructions for the removal and disassembly, repair and overhaul, assembly, and test and adjustment of the aiming circle M1, w/e in direct support, general support and depot maintenance shops.

Note. This manual contains exploded view illustrations which depict the complete disassembly of the materiel. This should not be construed as authority to disassemble materiel beyond that required to perform operations authorized on the maintenance allocation chart (MAC), appendix C or to replace parts other than authorized in the applicable columns in appendix B.

5-2. Coating and Cementing

General instructions for coating and cementing of optical elements as well as for operation of optical coating equipment are contained in MIL-C-675.

5-3. Replacing Parts

In subsequent paragraphs, it is understood that authorized parts damaged beyond repair are to be replaced.

5-4. General Maintenance Procedures.

TM 9-254 presents those general maintenance procedures that are often encountered in repairing fire control materiel. These procedures are presented as guides to maintenance personnel in the performance of their duties.

Note. In addition to manuals listed herein, refer to references listed in appendix A.

5-5. Painting, Lubrication, and Sealing

a. Painting. Refer to TM 9-213 for general information covering painting techniques.

b. Sealing.

(1) "Spaghetti" is the most convenient form for applying both the noncuring (MIL-S-11030) and the curing (MIL-S-11031) sealer to the telescope.

(2) Use either the hand-operated gun 4931-508-5424 or the pneumatic-operated gun 4930-764-8134, fitted with a small nozzle, to form the spaghetti MIL-S-11031, Spaghetti should be used immediately.

(3) Lay a bead of spaghetti around the lens seat of an optical element cell; use a lightly greased wood dowel to burnish sealer to the metal. Pinch off a small piece of spaghetti for saw slots, burnish in place; the same for screw heads.

c. Lubrication. Refer to MIL-L-6085A for lubricating procedures.

5-6. Cleaning

Refer to TM 9-208-1.

Section II. DISASSEMBLY

5-7. General

This section provides detailed instructions for the removal and disassembly of the aiming circle and the sequence of operation.

5-8. Disassembly of Aiming Circle M1— (Azimuth and Orienting Mechanisms)

Note. Item numbers shown below refer to figure B1, located in appendix B, unless otherwise indicated.

a. Remove special (1) and spring washer (2) from azimuth mechanism.

b. Disengage worm by actuating azimuth worm shoe (throwout device) (fig. 1-2).

c. Extract the orienting mechanism (3) from the body (4) and telescope assembly (5).

5-9. Disassembly of Telescope and Main Body Assemblies

Note. Item numbers shown below refer to figure B2, located in appendix B.

a. Loosen set screw (1), which locks elevation screw (2), adjusting plug (3), in body (4).

b. Unscrew plug (3) and remove compression spring (5).

c. Remove setscrews (6) from trunnion holding screws (7).

d. Unscrew and remove holding screws (7).

e. Remove screws (8), and washers (9).

f. Remove bracket (10), then remove telescope assembly (11).

Note. Place an identification mark around the bracket for the correct positioning upon assembly.

5-10. Disassembly of Elevation Mechanism and Associated Parts.

Note. Item numbers shown below refer to figure B2, located in appendix B.

a. Drive out taper pin (12) securing knob (13) to elevation screw (2) Remove the knob.

b. Remove setscrew (14).

c. Unscrew and remove retaining ring (15).

d. Turn elevation screw (2) counterclockwise and remove screw from body (4).

5-11. Disassembly of Magnetic Needle, Body and Associated Part.

Note. Item numbers shown below refer to figure B3 located in appendix B.

a. Remove screw (1) which secures the front end piece (2) and gasket (3) to body (4) and lift off the piece and gasket.

Note. Remove screw (7) and notation strip (8) only if required.

b. Release needle (6) by pressing inward the olive drab colored magnetic needle releasing plunger button located on side of body (4).

c. Remove the window assembly (5) forward.

Note. Carefully clean window with lens tissue paper, wrap in lens tissue and store assembly in a safe place until reassembly.

d. Remove needle (6) by lifting needle in a straight upward direction.

e. Wrap needle in lens tissue paper and store in a safe place until assembly.

Note. Item numbers shown below refer to figure B4, located in appendix B.

f. Unscrew and remove the releasing plunger (1), washers (2) and (3), and locking plunger (4) with associated components.

Note. When removing the locking plunger hold the yoke (5) down to prevent the needle lifting spring (6) from forcing yoke (5) upward.

g. Lift off the yoke (5).

h. Remove the detent ball (7) and spring (8).

i. Remove the screw (9) which secures the spring (6), and remove spring.

j. Place matching marks on the magnetic north needle dial (10) and body (11) to insure the same positioning of the index upon assembly.

k. Remove the screws (12) securing dial (10) to body (11). Remove the dial.

l. If pivot (13) is defective remove pivot from body (11).

Note. Turn body upside down and drive pivot from body.

5-12. Disassembly of Circular Level Assembly

Note. Note. Item numbers shown below refer to figure B4, located in appendix B.

a. Unscrew and remove the level assembly (14) and washer (15).

Note. Item numbers shown below refer to figure B5, located in appendix B.

b. Loosen adjusting screws (1) in cap (2) and unscrew cap from support (3). Remove the retainer washer (4) and vial (5).

5-13. Disassembly of Magnetic Needle Magnifier Assembly

Note. Item numbers shown below refer to figure B6, located in appendix B.

a. Remove screws (1) which secure rear end piece (2) to body (3), work end piece free from the sealing compound and synthetic paint and remove gasket (4).

b. Remove screws (5) which secure the clamping shoes (6). Remove shoes.

c. Loosen tangent setscrew (7) and extract the reticle holder (8) with reticle (9).

Note. If reticle is to be replaced, place holder in ethyl alcohol to dissolve the glass cement which holds reticle in place and remove reticle.

d. Unscrew magnifier assembly (10) with tubular wrench 5120-345-1381 and remove assembly.

Note. Item numbers shown below refer to figure B7, located in appendix B.

e. Place magnifier assembly in alcohol to dissolve the synthetic paint that seals the lens (1) in the cell (2).

f. Remove the separators (3) and lens (1) from cell (2).

Note. Before removing any lens from the cell clean away as much of the sealing compound around the lens as practical with ethyl alcohol or heat slightly to loosen compound.

Note. Where lenses are burnished into cells, the cell should be carefully centered in a lathe and the burnished metal turned off or burnish clear, leaving enough to permit reuse of cell.

5-14. Disassembly of Azimuth Worm Mechanism

Note. Item numbers shown below refer to figure B8, located in appendix B.

a. Drive out tapered pin (1) from knob (2) and slide knob off.

b. Remove setscrew (3) securing cap (4) and remove special setscrew (5) securing socket (6). Unscrew cap and remove socket.

c. Remove the screws (7) securing disk (8), micrometer (9), drum (10) to adapter (11). Remove disk, micrometer, and drum.

d. Drive out taper pined (12) from adapter (11) and slide off adapter.

e. Remove screw (13), securing index plate (14) to shoe (15), and remove index plate and shoe.

f. Remove setscrew (16), securing adjusting plug (17), and unscrew plug.

g. Remove spring (18).

h. Remove worm (20) from body (21).

i. Remove plunger (19).

5-15. Disassembly of Orienting Mechanis and Housing Assembly

Note. Item numbers shown below refer to figure B9, located in appendix B.

a. Remove clamping screw (1) from housing (2) by driving out tapered pin (3) from round nut (4).

b. Unscrew and remove nut (4), and washer (5).

c. Unscrew and remove clamping screw (1).

5-16. Disassembly of Orienting Mechanism and Related Parts

Note. Item numbers shown below refer to figure B10, located in appendix B.

a. Drive out tapered pin (1) from each orienting knob (2)and remove knobs and washers (3).

b. Remove the screws (4) securing the plate (5) and spring tension clips (6) to housing (7).

c. Remove plate (5) and clip (6).

d. Remove setscrew (8) and special screw (9) which lock cap (10) in housing (7).

e. Remove cap (10) with spanner wrench 5120-595-8996.

f. Remove worm (11), ball socket (12), and spring plunger (13).

Note. Item numbers shown below refer to figure B9, located in appendix B.

g. Remove the housing (2) from the azimuth worm gear (6) by pulling housing and worm gear apart.

5-17. Disassembly of Telescope Assembly

Note. Item numbers shown below refer to figure B11, located in appendix B.

a. Remove special screws (1) securing front cover (2) with objective assembly (3), and special screw (1) securing rear cover (4) with eyepiece assembly (5) to telescope body (6).

b. Work two cover assemblies free from sealing compound.

Note. Loosen setscrew (7) securing cover (4) to body (6).

5-18. Disassembly of Telescope Body

Note. Item numbers shown below refer to figure B12, located in appendix B.

Remove and disassemble the porro prisms and tubular level vial from the body assembly as listed in *a* through *c* below:

a. Press down and remove flat springs (1) which hold the porro prisms (2) inside body (3). Remove and retain springs (1).

Note. Prisms are staked in positions with shellac which must be dissolved before removal using ethyl alcohol. If

rubber cement has been used to stake prisms remove cement with rubber solvent.

b. Remove and retain porro prisms (2).

c. Only if damaged, remove and replace tubular level vial as listed in (1) through (3) below:

(1) Remove the two setscrews (4).

(2) Unscrew and remove plugs (5).

(3) Using a small piece of shim stock (or equivalent), remove the cal—cined gypsum (plaster of paris) from around the vial (6) and remove damaged vial from body assembly (3).

d. Remove window (7) and detent (8) only if defective.

5–19. Disassembly of Eyepiece Assembly

Note. Item numbers shown below refer to figure B11, located in appendix B.

a. Remove headless setscrew (7) which locks eyepiece assembly (5) to cover (4). Unscrew and remove the eyepiece assembly.

Note. Item numbers shown below refer to figure B13, located in appendix B.

b. Remove the special screw (1) from the focusing sleeve (2).

c. Remove the focusing sleeve (2) from lens cell assembly (3).

d. Using tubular wrench 5120–345–1384 remove the retaining ring (4) from reticle assembly (5) to adapter (6). Remove reticle assembly (5) from adapter.

5–20. Disassembly of Lens Cell Assembly

Note. Item numbers shown below refer to figure B14, located in appendix B.

a. Using tubular wrench 5120–345–1388 unscrew retaining ring (1).

b. Remove the eyelenses (2), and separator (3), from cell (4).

Note. It may be necessary to apply heat to soften the optical lens sealing compound.

5–21. Disassembly of Reticle Assembly

Note. Item numbers shown below refer to figure B15, located in appendix B.

a. Using tubular wrench 5120–345–1384, unscrew and remove retaining ring (1) from cell (2).

b. Place a scribe mark on cell (2) to line up with crossline on reticle (3).

c. Using lens tissue paper between the fingers, apply a slight pressure to free the reticle (3) from the cell (2).

Caution: **Reticle is not sealed in the cell, however, exercise care when pushing out the reticle as it may become chipped if allowed to tilt.**

5–22. Disassembly of Objective Assembly

Note. Item numbers shown below refer to figure B16, located in appendix B.

a. Loosen headless screw (1).

b. Using tubular wrench 5120–345–1393 unscrew retaining ring (2) and remove adapter (3).

Note. It may be necessary to apply heat to soften the optical lens sealing compound to release adapter from front cover.

c. Remove headless screw (1) and remove cell assembly (4) from cover (5).

5–23. Disassembly of Objective Cell Assembly

Note. Item numbers shown below refer to figure B17, located in appendix B.

a. Clean away as much of the sealing compound as practical from the cell assembly by heating slightly or with ethyl alcohol.

b. Unscrew and remove retainer (1) from cell (2).

c. Using lens tissue paper between the fingers apply slight pressure to free the objecitve lens (3). Refer to caution outlined in paragraph 5–21 *c* above.

Note. Place an identification mark on the edge of the lens and cell to insure the same positioning upon assembly.

5–24. Disassembly of Tripod M5

Note. Item numbers shown below refer to figure B18, located in appendix B.

a. Remove plug (1) from support tube (2) and tripod head (3).

Note. If plug head is larger than support tube, it should be turned down to 0.920–.010 inch and knurled with a coarse knurl.

Note. Item numbers shown below refer to figure B19, located in appendix B, unless otherwise indicated.

b. Holding the round nut (1) with plier loosen

clamping screw (2) and remove support tube (fig. B18, 2) from the tripod head (3).

Note. Item numbers shown below refer to figure B20, located in appendix B.

c. Remove round head screw (1) from spindle socket (2).

d. Remove spindle (3) from spindle socket (2).

e. Remove round nut (4) and clamping screw (5) from spindle socket.

f. Melt solder by applying heat to the end of the support tube (6) housing spindle bearing (7) and remove bearing.

Note. Item numbers shown below refer to figure B18, located in appendix B.

g. Remove cone point screw (4) which locks round nut (5) on hinge pin (6) and remove the nut (5), pin (6), and upper leg assembly (8). Remove the lower leg assembly (7) and other leg assembly (7) in the same manner.

Note. Item numbers shown below refer to figure B21, located in appendix B.

h. Melt solder by applying heat to round nut (1) and unscrew nut from lower tripod leg assembly (2).

i. Remove clamping screw (3) from leg clamp (4).

Note. Remove clamp only as required.

j. Remove flat head screw (5) which locks the leg shoe (6) on the lower tripod leg assembly (2), and leg collar (7). Unscrew shoe from collar.

k. If necessary to remove the leg collar (7) apply heat to the collar to melt solder and pull collar straight out.

l. Remove upper tripod leg assembly (8) from lower tripod leg (2) by removing flat head screw (9).

m. Remove hinges (10) from legs.

5-25. Disassembly of Instrument Light M2

Note. Item numbers shown below refer to figure B22, located in appendix B.

a. Remove cap (4), with spring (5), and battery (6), from case (3).

b. Remove lamp bracket assembly (7), from wire lead and body assembly (8).

c. Remove lamp (9), from wire lead and body assembly (8), and store lamp in a safe place.

d. Remove handlight cap (10) from long wire cable lead (11).

e. Remove lamp (9) from long wire cable lead (11) storing lamp in a safe place.

f. Unscrew and remove round head screw (1).

g. Remove cover assembly (2) from case (3).

5-26. Carrying Case M6A1

Check carrying case general appearance for such things as damaged metal, wood, straps, buckles, etc. and replace case, if required.

5-27. Aiming Circle Cover M409

Check cover and make certain it is free of mold, breaks, tears, or loose stitching and replace cover, if required.

Section III. ASSEMBLY

5-28. General

This section provides inspection, cleaning, repair, and assembly instructions for the aiming circle M1, w/e.

5-29. Inspection

Inspect all disassembled items as indicated in *a* through *g* below:

a. Nicks or burrs on working surfaces.

b. Damaged or stripped threads.

c. Bare spots or damaged finish or finished surfaces.

d. Deformed screw slots or mushroomed pins.

e. Bent pins.

f. Badly damaged or worn parts.

g. Excessive scratches, pits, digs, chips etc. on lens, windows, prisms, etc.

5-30. Cleaning

Refer to TM 9-254 for cleaning procedures.

5-31. Repair

a. Remove all corrosion, nicks or burrs (refer to TM 9-254).

b. Replace cross threaded, stripped, or badly damaged screws.

c. If possible, straighten and repair any bent or deformed component.

d. Repair bare spots or damaged finish.

e. Replace any gear with damaged teeth.

f. Straighten worms that are bent, if possible, and replace if worm cannot be straightened or if too badly damaged.

g. Any lenses, windows, prisms, etc. with excessive scratches, pits, digs, chips shall be corrected or component replaced.

h. Any leads, cables, wires, contact terminals, etc., which are damaged beyond repair shall be replaced.

i. Replace any component which is excessively worn or badly damaged.

Note. In addition to instructions listed above utilize the appropriate references listed in appendix A.

5-32. Assembly of Instrument Light M2

Note. Item numbers shown below refer to figure B22, located in appendix B.

a. Install lamp (9) into long wire lead (11) and secure cap (10) to long wire lead (11).

b. Install lamp (9) into wire lead and cable assembly (8).

c. Connect wire lead and cable assembly (8) to bracket assembly (7).

d. Install battery (6) in case (3).

e. Install spring (5).

f. Install cap (4) securing spring (5) and battery (6) inside case (3).

5-33. Assembly of Tripod M5

Note. Item numbers shown below refer to figure B21, located in appendix B.

a. Slide lower tripod leg (2) over the upper tripod leg assembly (8) and secure with screw (9).

b. Install lower leg collar (7) and solder in place.

c. Screw the leg shoe (6) on the lower tripo leg (2) and install the flat head screw (5).

d. Install clamping screw (3) in the leg clam (4) mounted on lower tripod leg (2).

e. Screw round nut (1) on clamping screw (3

f. Screw hinge (10) on the upper tripod a sembly (8).

Note. Item numbers shown below refer to figure B1 located in appendix B.

g. Install hinge pin (6).

h. Install round nut (5) until hinge tension great enough to hold leg horizontally.

i. Secure with cone point screw (4).

Note. Item numbers shown below refer to figure B2 located in appendix B.

j. Install spindle bearing (7) into support tub (6) and then solder in place.

k. Install clamping screw (5) in spindle socke (2).

l. Screw on round head nut (4) and solder i place.

m. Install spindle (3) in the spindle socket (2)

n. Place spindle socket (2) over spindle bear ing (7) and install round head screw (1).

Note. Item numbers shown below refer to figure B1 located in appendix B unless otherwise indicated.

o. Install support tube (2) into tripod hea (B19, 3).

p. Install clamping screw (B19, 2) into tripo head (B19, 3) and install round nut (B19, 1) o screw (B19, 3). Tighten screw and nut.

q. Install support tube (2) in tripod head (3) and install plug (1) in support tube.

5-34. Assembly of Objective cell Assembly

Note. Item numbers shown below refer to figure B17, located in appendix B.

a. Apply a small amount of lens sealing compound in two or three spots around the inside of cell (2).

Caution: **Do not apply an excessive amount of compound around inside of cell which may cause damage to the cell.**

b. Install lens (3) inside cell (2) alining identification marks indicated in paragraph 5-23 above.

c. Apply a small amount of optical lens sealing compound on the inside of the cell (2) and install and secure retainer (1) tightly.

5-35. Assembly of Objective Assembly

Note. Item numbers shown below refer to figure B16, located in appendix B.

a. Place a small amount of lens sealing compound inside the front cover (5) where the adapter (3) fits.

b. Install adapter (3) inside front cover (5) rotating adapter until the holes in the adapter and front cover are in alinement. Install screws (1) in holes.

c. Install retaining ring (2) in front cover (5) and tighten using tubular wrench 5120-345-1393; stake the ring.

d. Install cell assembly (4).

Note. Check for parallax after the optical system has been installed and if necessary, rotate the objective cell to eliminate parallax and tighten headless screw (1).

5-36. Assembly of Reticle Assembly

Note. Item numbers shown below refer to figures B13, B15 and B16, located in appendix B.

a. Using lens tissue paper between fingers slightly press reticle (fig. B15, 3) into cell (2), making certain that identification marks indicated in paragraph 5-21*c* above line up and the horizontal line of the reticle alines with the slot in the cell.

b. Install retaining ring (fig. B15, 1) using tubular wrench 5120-345-1384.

c. Install the reticle assembling (fig. B15) in eyepiece adapter (fig. B13, 6) and make certain that the etched surface of the reticle and ring (fig. B15, 3 and 1) is toward the objective lens of objective assembly (fig. B16, 4).

d. Install the retaining ring (fig. B13, 4) which holds the reticle cell assembly in the eyepiece adapter (fig. B13, 5 and 6).

e. Check the verticality of the reticle after the optical cell has been installed. To remove tilt, rotate the reticle cell (fig. B15, 2) with face spanner wrench 5120-595-8996 while holding the eyepiece adapter (fig. B13, 6) in place, then tighten the retaining ring (fig. B13, 4) with tubular wrench.

5-37. Assembly of Lens Cell Assembly

Note. Item numbers shown below refer to figure B14, located in appendix B.

a. Apply a small amount of optical lens sealing compound on outside of eyelens (2) and seal lens in place on each side of the separators (3).

b. Install lens (2) and separator (3) inside cell (4).

c. Install retaining ring (1) and tighten using tubular wrench 5120-345-1388.

5-38. Assembly of Eyepiece Assembly

Note. Item numbers shown below refer to figure B13, located in appendix B.

a. Apply a small amount of instrument lubricating grease on the inside and outside of adapter (6).

b. Slide cell assembly (3) into adapter (6).

c. Assemble the focusing sleeve (2) to the cell assembly (3).

Note. The hole in the adapter must be in alinement with the reticle illuminating window.

d. Install special screw (1) alining screw with hole in focusing sleeve (2), cell assembly (3), and reticle assembly (5).

e. Check the operation of the focusing sleeve.

Note. Turn the focusing sleeve (2) in or out from the center of movement to obtain clear definition. If it is necessary, move the cell assembly (3) towards the reticle (5) by placing a shim or shims on a fine layer of optical lens sealing compound between the shoulder of the cell and the eyelens (fig. B14, 2). If it is necessary to turn the focusing sleeve out to obtain clear definition, remove any shims that may be present, drill and tap a new hole for the special screw, and install the screw. The focusing sleeve must be in the center of its movement within a tolerance of 0.06 when the reticle is sharp and clear.

Note. When checking the operation of the sleeve refer to figures B13, B14, B15, and B16, as required.

5-39. Assembly of Telescope Assembly Body

Note. Item numbers shown below refer to figure B12, located in appendix B.

Assemble the tubular vial and prism in the body assembly as listed in *a* through *h* below.

a. Place components in a convenient working position.

b. Install vital (6) in telescope body assembly (3).

c. Shim the vial until bubble indicates level (bubble is in center of vial) and when the line of sight is in a true horizontal plane with the objectives eccentric's thinnest and thickest walls in a horizontal plane to permit maximum adjustment. Make several checks and then seal vial in place utilizing calcined gypsum.

Note. It may be necessary to make checks again after vial has been completely installed before sealing vial.

d. Install and screw in plugs (5).

e. Install setscrews (4) locking the two plugs (5) in place.

f. Place the porro prisms (2) in position inside body (3) and carefully install the springs (1).

g. Utilizing a padded stick and lens tissue paper adjust the prisms for 90° positioning with respect to each other in order to eliminate tilt of field of view.

Note. This instruction should be carefully performed because if the prisms are not at 90°, the field will be tilted.

h. Stake the prisms (2) and flat springs (1).

Note. When instrument is used under conditions of extreme heat the porro prisms must not be staked with shellac varnish; use rubber cement. However, optical lens sealing compound may be used as a sealing agent under all conditions.

5–40. Assembly of Telescope Assembly

Note. Item numbers shown below refer to figure B11, located in appendix B.

a. Install and secure eyepiece assembly (5) to cover (4).

b. Install setscrew (7) and tighten.

c. Apply a small amount of optical lens sealing compound to the outer edges of the inner faces of cover (4).

d. Install cover (4) with eyepiece assembly to body (6).

e. Install screws (1) and secure cover to the body (6).

f. Utilize the same instructions outlined in *c* through *e* above when assembling the objective assembly (3) to cover (2) and installing cover with components to body (6).

5–41. Assembly of Orienting Mechanism and Housing Assembly

Note. Item numbers shown below refer to figure B10 located in appendix B.

a. Install worm (11) inside housing (7).

b. Place ball socket (12) on worm (11).

c. Install plunger (13) in housing (7).

d. Install setscrew (8), and special screw (9) which locks cap (10) in housing (7). Tighten screws.

e. Place spring (6), plate (5) against housing (7).

f. Secure plate (5) to the housing (7) with screws (4).

g. Install washers (3) on each end of the worm (11).

h. Place knobs (2) on their respective positions on worm (11).

i. Place and aline a pin (1) in each hole of the knobs (2) and drive in pins.

Note. Item numbers shown below refer to figure B9, located in appendix B.

j. Install clamping screw (1), washer (5), nut (4), tapered pin (3) removed from housing (2) indicated in paragraph 5–15 above.

k. Install the assembled orienting mechanism housing (2) in gear (6).

Note. When installing components make certain that they are placed in the correct locations and are in alinement.

5–42. Assembly of the Azimuth Worm Mechanism

Note. Item numbers shown below refer to figure B8, located in appendix B.

a. Install plunger (19), spring (18) inside body (21). Place socket (6) on worm.

b. Install and position worm (20) in the correct location inside body (21).

c. Place plug (17) in position and tighten plug which will secure the plunger (19) and spring (18) to the body.

d. Install setscrew (16) into the body (21) alining screw with hole in body (21) and hole in plug (17). Tighten setscrew (16).

e. Install shoe (15) on worm (20) and secure index plate (14) to shoe (15) with screw (13).

f. Install adapter (11) on worm (20), and install a pin (12) in each hole in the worm and adapter. Drive in pin.

g. Install drum (10), micrometer (9) and disk (8) on worm (20). Secure these components to the adapter (11) with screws (7).

h. Install special setscrew (5) in hole of socket (6), and setscrew (3) in hole of cap (4). Tighten screws.

i. Install cap (4) into body (21).

j. Install knob (2) in worm (20) making certain that the associated holes are in alinement with each other.

k. Install pin (1) in hole and drive in pin.

5-43. Assembly of Magnetic Needle Magnifier Assembly

Note. Item numbers shown below refer to figure B7, located in appendix B.

a. Place a small amount of synthetic paint around the corner of the cell (2) where the lens seats and around the inner edge of the front separator. Also paint threads of cell.

Note. Make certain that all areas are clean before applying paint.

b. Place a small amount of optical lens sealing compound on inner edges of separator (3).

c. Carefully position lens (1) one at a time on separator (3) and place them into their seating positions.

d. Install the separators (3) with lens (1) into cell (2).

Note. Item numbers shown below refer to figure B6, located in appendix B.

e. Screw magnifier assembly (10) into the end piece (2) and tighten.

f. Place a small amount of cement on the dovetail slot in the holder (8) and install the reticle (9) in slot on holder.

Note. Finished edge of the reticle must reach the top of the holder when installed.

g. Install holder (8) with reticle (9) in end piece (2).

h. Install setscrews (7) in end piece (2).

i. Install the clamping shoes (6) inside end piece (2).

j. Install screws (5) in end piece (2) and tighten.

k. Apply optical lens sealing compound to gasket (4) and position gasket on body (3).

l. Position end piece (2) on body (3) and secure end piece to body with screws (1).

Note. Prior to securing end piece it may be necessary to sight into a collimating telescope held in front of the magnifier assembly and note if the etched lines on the reticle (9) are sharp and clear. If not clear, adjust the magnifier assembly by screwing the magnifier assembly in or out. Adjust the reticle for declination after the aiming circle is completely assembled.

m. Place a small amount of schellac varnish on the edge of the magnifier assembly (10).

n. Place the magnifier assembly (10) in end piece (2) and using tubular wrench 5120-345-1381 tighten the magnifier assembly.

5-44. Assembly of Circular Level Assembly

Note. Item numbers shown below refer to figure B5, located in appendix B.

a. Install washer (4) and vial (5) inside support (3).

b. Screw support to the cap (2).

c. Install the three screws (1).

Note. Item numbers shown below refer to figure B4, located in appendix B.

d. Place washer (15) on level assembly (14) and screw assembly into body (11).

e. Place the body (11) on a level surface plate and adjust the three screws alternately, until bubble in the level is concentric with the etched lines on the top of the vial.

5-45. Assembly of Magnetic Needle, Body Assembly and Associated Parts

Note. Item numbers shown below refer to figure B4, located in appendix B.

a. Place dial (10) on body (11) in position where matching marks have been made.

b. Install screws (12) in dial holes, and tighten screws securing dial to the body.

c. If pivot (13) has been removed install pivot using a brass driving pin.

d. Install spring (6) in position and secure spring to body (11) with screw (9).

e. Position spring (8) and ball (7) in the correct location.

f. Position the yoke (5) in the correct location on top of ball (7) and spring (8).

g. Install washers (2) and (3) and plungers (1) and (4) through the respective holes in the body (11) any yoke (5). Tighten plungers.

Note. Item numbers shown below refer to figure B3, located in appendix B, unless otherwise specified.

h. Press inward on the red colored magnetic needle clamp plunger and place needle (6) on pivot pin (B4, 13).

i. Install window (5) in body (4).

j. Install gasket (3) and piece (2) to the body (4).

k. Install the setscrews (1) in holes of piece (2) and gasket (3).

l. If required, secure notation strip (8) with screws (7).

5-46. Assembly of Telescope and Main Body Assemblies

Note. Item numbers shown below refer to figure B2, located in appendix B.

a. Install elevation screw (2) in body (4) turning screw in a clockwise direction.

b. Install retaining ring (15) on elevation screw (2).

c. Install setscrew (14) and tighten.

d. Install knob (13) on elevation screw (2).

e. Install pin (12) on knob (13) and aline pin with holes in knob and screw (2).

f. Drive in pin (12).

g. Position telescope assembly (11) on body (4).

h. Position bracket (10) on body (4) and rest against telescope assembly (11).

i. Install washers (9) and screws (8) in their respective location inside holes on bracket.

j. Install screw (7) through hole in bracket (10) and hole in telescope assembly (11).

k. Install compression spring (5), plug (3) on elevation screw (2).

l. Install setscrew (1) in hole on body (4) and secure screw.

m. Make certain that all components are in their correct position and in alinement then tighten screws (8) and (7).

n. Install setscrew (6) in screw (7) and tighten.

5-47. Assembly of Azimuth Mechanism to Orienting Mechanism

Note. Item numbers shown below refer to figure B1, located in appendix B.

a. Position the azimuth and orienting mechanism (3) into the body (4) and telescope assembly (5).

b. Install spring washer (2) and special screw (1) into hole in orienting mechanism. Tighten screw which will secure the azimuth and orienting mechanism (3) to the body (4).

Section IV. FINAL TESTS, ADJUSTMENTS, AND CORRECTIONS

5-48. General

The tests, adjustments, and corrections that follow are generally performed after repair and final assembly of the aiming circle M1 (fig. 1-1) has been completed. Most of the tests, adjustments, and corrections will be made utilizing the special tools and equipment listed in table 4-1 and referring to paragraphs 5-7 through 5-47 when disassembly and assembly should be required. Aiming circle M1 shall meet the tolerances specified in table 5-1.

5-49. Setting Up Azimuth Test Fixture

a. Place azimuth test fixture (fig. 4-3) with collimator (fig. 4-1), installed on a heavy steel table (or equivalent) to insure stability.

b. Level fixture accurately with the three leveling screws on which fixture stands, until the adapter support plate will remain level in any location to which the azimuth ring is rotated.

c. Place collimating telescope (fig. 4-5), installed in collimating telescope holder (fig. 4-4) and mounted on a universal surface gage, on the

leveled support plate of the fixture. Direct the line-of-sight of the telescope at a plumb line, loosen the locking screw of the holder, and rotate the telescope until its vertical reticle line coincides with the plumb line along its entire length. Tighten the holder locking screw.

d. Turn the azimuth ring of the fixture (fig. 4-3) until the line-of-sight of the collimating telescope (fig. 4-5) is directed into the collimator (fig. 4-1). If the reticle of the collimator is not absolutely plumb to the collimating telescope reticle, loosen the screws, holding the collimator until it is perfectly plumb to the telescope reticle. Tighten the screws holding the collimator. Remove the surface gage with attached holder and telescope from the support plate.

e. Install a suitable adapter, simulating the tripod support tube, on the support plate of the fixture (fig. 4-3) with the three cam lock screws.

f. Adjust the knurled objective scale of the collimator (fig. 4-1) to indicate between 30 and 150 yards.

Table 5-1. Tolerances for Aiming Circle, M1

Item	Condition	Tolerances		
		New instruments	Rebuilt instruments	Limit of serviceability
Focusing sleeve	Middle of movement for sharp focus (inch).	0.05	Approximate center	Approximate center
Line of sight	Bubble of tubular level central line of sight is horizontal (mil).	0.33	0.5	[1] 0.5
	Horizontal travel (line of sight returned to target by means of fixture);			
	Vertical deviation when rotated by azimuth mechanism (mil).	1	1.5	1.5
	Vertical deviation when rotated by orienting mechanism (mil).	0.5	0.75	0.75
	Vertical deviation when rotated about vertical spindle (mil).	0.5	0.75	0.75
	Vertical deviation when rotated by any combination of above (mil).	1.5	2.25	2.25
	Vertical deviation when reversed by azimuth or orienting mechanism (mil).	0.3	0.5	0.5
	Vertical travel (mil)	0.5	0.75	0.75
	Parallel to vertical plane through needle pivot and indexes (mil).	0.5	0.5	0.5
Circular level	Bubble central when azimuth scale lies in horizontal plane.	Within limit of etched circle	Same	Same
Reticle	Verticality of vertical cross line (mils).	0.5	0.5	0.5

See footnote at end of table.

Table 5-1. Tolerances for Aiming Circle, M1—Continued

Item	Condition	Tolerances		
		New instruments	Rebuilt instruments	Limit of serviceability
	Coincidence of 60-mil graduations with testing target (mils).	1.5	1.5	1.5
Parallax	At 75 to 85 yards from instrument.	None	None	None
Spindle clamp	Effect on leveling caused by clamping and unclamping shall not exceed (mils).	0.5	0.75	0.75
Azimuth mechanism	Backlash (mils).	0.5	0.75	0.75
	Error in reading azimuth angles including backlash shall not exceed (mils).	1.5	2.0	2.0
Orienting mechanism	Backlash (mils).	None	0.75	0.75
Elevating mechanism	Backlash (mils).	None	None	None
Magnetic needle	Half period (seconds).	Less than 4.0	Same	Same

[1]Apply the correction value to all line of sight readings if the error exceeds 0.5 mil.

5-50. Vibration Test

Caution: **Lock compass needle before vibrating.**

a. Utilizing a suitable adapter, mount the aiming circle on the vibration tester (fig. 4-6) and vibrate the instrument in a verticle plane for a period of two and one half minutes ±15 seconds at an amplitude of not less than 1/16-inch (1/8-inch maximum total movement) at a frequency of 30 cycles per second.

b. After vibration, remove the aiming circle and adapter from the tester (fig. 4-6) and inspect for dirt, scratches, broken or defective components, clean or repair as required.

5-51. Eyepiece Focus

a. Test. With the aiming circle mounted on the azimuth fixture as indicated in paragraph 5-50 above, direct the line of sight into the collimator. Set the collimator scale to 150 yards. Place focusing sleeve in center of its movement, and sight into collimator. Observe whether target and reticle images are well defined.

b. Adjustment.

(1) Adjust eye and field lens assembly to obtain good reticle definition.

(2) Adjust objective cell to obtain definition of the field.

5-52. Parallax

a. Test. With the focusing sleeve in the center of its movement, and sighting on an 80 yard target, check for parallax by moving head vertically and horizontally. Observe any movement between reticle and target.

b. Adjustment. To remove any apparent parallax, adjust objective cell.

5-53. Backlash

a. Azimuth Mechanism. With the instrument mounted on the azimuth test fixture as indicated in paragraph 5-52*a* above, set azimuth scale and micrometer at zero. Rotate the instrument with the orienting knob until the vertical reticle line is superimposed on a clearly defined target. Note micrometer reading, then continue a few mils in the same direction. Reverse the direction and again view target without overpassing. The difference between readings must not exceed 0.75 mils. Adjust mechanism if required.

b. Orienting and Elevation Mechanisms. Make checks similar to *a* above, to determine backlash does not exceed 0.75 mils in these mechanisms. Lines scribed on ends of knobs will aid in estimating mil measurements.

5-54. Horizontal and Vertical Travel

a. Horizontal Travel. With the instrument on

the azimuth fixture, rotate the instrument with any combination of azimuth and orienting movements for 1600 mil increments and return with the azimuth fixture ring. Repeat for 6400 mils. The horizontal reticle line should not deviate more than 2.25 mil from a target. When reversing direction the displacement between reticle line and target must not exceed 0.5 mil. When testing separately, the azimuth worm will not displace the reticle and target more than 1.5 mils and the orienting worm movement will not displace the reticle and target more than 0.75 mils.

b. Vertical Travel. When the telescope is elevated or depressed the reticle must not deviate more than 0.75 mil from a plumb line. The stop mechanism should permit at least 8 degrees (142 mils) of movement.

5–55. Tubular Level

Place instrument on a leveled surface plate. Also place a collimating telescope in a V block on the plate. With the level bubble centered, measure from the center of the eyepiece to the center of the collimator. Construct a target using this same dimension and place it 150 yards away. Sight on the target through collimator and instrument. If lines of sight are more than 0.5 mil beyond the measurement, adjust level vial to suit (para 5–39 above).

5–56. Circular Level

a. Place aiming circle on a level surface plate. The bubble in the circular level vial should be centered in the etched lines on top of the vial and should remain centered when instrument is rotated 6400 mils.

b. If bubble in the circular level vial does not remain centered turn the adjusting screws (fig. B5, 1) until the bubble is concentric with the etched lines on the top of level vial.

5–57. Magnetic Needle

a. Place aiming circle on a level surface.

Note. No magnetic materials should be in close proximity to the instrument during the procedure.

b. By attraction of an iron object, such as a screwdriver, displace the magnetic needle about 30° from the equilibrium position. Remove the screwdriver allowing the needle to swing to the right and left of its equilibrium position.

c. Using a watch with a sweep hand measure the time required for the needle to complete five periods. A period of the needle is the time required for it to move from its maximum displaced position to right of the point of equilibrium, to the extreme left, and back to the initial position.

d. If the total time is more than 40 seconds, or more than 8 seconds per period, the magnetism of the needle is weak.

e. If there is a weak needle, out of shape, or north and south does not line up with the respective indexes, replace needle in accordance with paragraphs 5–11 and 5–45.

5–58. Clamp and Releasement of Plungers

a. Operate the olive drab and red plungers to see that the magnetic needle can be released for rotation.

b. If by operation of either plunger it fails to clamp or release the needle, this indicates a damaged part and/or component necessitating repair or replacement of the part or component. Repair or replace as required.

5–59. Azimuth Worm Throwout Lever

a. Operate the azimuth worm throwout lever to see that it moves freely without binding, and that it will fully disengage and engage the worm and worm gear. There must be no drag of teeth when lever is pushed to the outward position and the azimuth scale index is rotated. Binding of the lever indicates a malfunctioning of the throwout shoe, and drag of the teeth indicates improper adjustment of either the azimuth compression spring or ball cap and socket of the worm mechanism.

b. Bent throwout shoe or burrs between the shoe and body may cause the throwout shoe to stick and prevent complete disengagement of the worm. Remove the burrs with a fine mill file or oilstone and polish the surface with crocus cloth. Replace bent or broken shoe.

5–60. Tripod M5

a. With the proper adjustment of the clamping screw on the tripod M5 (fig. 1–1) the ball and socket should have enough tension to support the aiming circle M1 in any position.

Note. Refer to figures B18, 19, 20, and 21, as required.

b. Check the tripod leg assembly joints at the tripod bend for proper tension and adjust as re-

quired as listed in (1) and (2) below.

(1) Standing tripod in an upright position, extend one leg assembly to the limit of its movement raising the leg to a horizontal position and then releasing it.

(2) The hinge tension should be great enough to just hold the leg horizontally. Repeat this operation with the other two legs.

5-61. Instrument Light M2

Note. Refer to figure 1-1, as required.

Remove the top half of the carrying case cover and check to see that spring clamps are painted and undistorted in shape. See that the snap on the bulb case functions and is free of corrosion. Examine the insulation on the wiring for bare spots and deterioration. Place a battery in the battery case, both lamps in the sockets provided and turn on the switch. Make sure both lamps are lit and remain lit while flexing the wiring throughout its length. Flickering indicates loose connection or broken wire. Batteries should be clean and free of bulges or exudation and should have charge. Lamps should light when tested with battery.

5-62. Carrying Case M6A1

Check the carrying case for general appearance. Check all leather, metal, and wood components and straps and buckles and make sure they are clean and free of corrosion, rot, mold, tears, broken stitching, breaks, or loose paint. Examine all support pads in the carrying case for rigidity and condition of the leather. Check the carrying case lid to see that it is not bent out-of-round, that it can be easily removed, and will hold all contents without damage.

5-63. Aiming Circle Cover M409

Check the canvas cover and make sure that it is free of mold, breaks, tears, or loose stitching.

CHAPTER 6

FINAL INSPECTION

6-1. General

Final inspection is completed after repair has been completed to insure that the material is serviceable according to established serviceability standards. Any item containing defects disclosed by the final inspection will be further adjusted or repaired to place it in a serviceable condition.

6-2. Optical—Visual, Mechanical—Visual and Electrical Inspection

Perform the applicable inspections in accordance with paragraphs 2-3 through 2-8, 3-6 through 3-10, and 4-6 through 4-12.

CHAPTER 7

SHIPMENT AND ADMINISTRATIVE STORAGE AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND ADMINISTRATIVE STORAGE

7-1. Shipping Instructions

a. Responsibility. When shipping the aiming circle M1 w/e, the unit commander will be responsible for shipping the materiel adequately processed, packaged and packed to reach the echelon of maintenance for required repairs, and/or in a serviceable condition in the case of troop movement.

b. Army Shipping Documents. Prepare Army shipping documents accompanying freight.

c. Preparation for Shipment. Aiming circle M1 w/e, removed from administrative storage (para 7-3) for shipment need not be repackaged unless inspection reveals them to be inadequately packaged, or when it is necessary because of anticipated in-transit weather or shipping conditions. Packaging must not be removed or disturbed, except as it is necessary to insure that the aiming circle M1 w/e will reach the echelon of maintenance for required repairs adequately processed and packaged, and/or in a serviceable condition in the case of troop movement. If packaging has been removed, materiel must be repackaged prior to shipment.

7-2. Preservation, Packaging, Packing, and Marking Instructions

a. Preservation and Packaging. Preservation must be sufficient to protect the aiming circle M1 w/e against deterioration and damage during shipment and administrative storage and/or the subsequent interval prior to use. Under no condition will the aiming circle M1 w/e with critical surfaces be packaged and packed without benefit of sufficient preservatives to assure adequate protection of materiel. Preservatives must be compatible with end use requirements.

b. Packing. Packing must be acceptable to the carrier while affording adequate protection to the aiming circle M1, w/e during shipment and administrative storage and/or the subsequent interval prior to use.

c. Marking. All unit packages and exterior shipping containers will be marked.

7-3. Administrative Storage

a. General.

(1) Unit commanders may, with the approval of major commanders, place aiming circle M1 w/e that are beyond the maintenance capability of the unit in administrative storage or return them to supply agencies. Materiel must be stored in the most favorable location available, preferably in warehouses which afford protection from exposure to the elements and pilferage.

(2) All aiming circle M1 w/e in administrative storage must be maintained so that they will be ready for immediate use and/or ready for shipment.

(3) Administrative storage is restricted to a period of 90 days and must not be extended unless the materiel is reprocessed.

b. Storage Procedures.

(1) Maintenance will consist of inspecting, cleaning, servicing, preserving, and lubricating, as required and will also include minor repair parts replacement, if required.

(2) Lubricate materiel in accordance with instructions prescribed in MIL-L-6085A.

(3) Protect the aiming circle M1 w/e with the cover provided.

(4) Provide access to the materiel to permit inspection, servicing, and removal from storage.

(5) Mark the aiming circle M1 w/e, "Administrative Storage" (by use of tag or other convenient method).

c. Inspection in Administrative Storage. Inspection will usually be visual and must consist of at least a walk-around examination of the equipment to observe any deficiencies that may have occurred. Inspect equipment in open storage weekly and that in covered storage monthly. Immediately after any severe storm or environmental change inspect all equipment. The following are examples of things to lok for during visual inspection.

(1) Condition of preservatives, seals, and wraps.

(2) Torn, frayed, or split canvas covers and tops.

(3) Corrosion or other deterioration.

(4) Missing or damaged parts.

(5) Water in compartments.

(6) Any other readily recognizable shortcomings or deficiencies.

d. Repair During Administrative Storage. Keep equipment in an optimum state of readiness. Accomplish required services and repairs as expeditiously as possible.

e. Rotation. To assure utilization of all assigned materiel, rotate items in accordance with any rotational plan that will keep equipment in an operational condition and reduce maintenance effort.

7-4. Loading and Blocking Instructions

Organizational maintenance personnel may assist, as required, in loading and blocking boxed equipment into boxcars and/or trucks.

Section II. DESTRUCTION OF MATERIEL TO PREVENT ENEMY USE

7-5. General

a. Destruction of the aiming circle M1 when subject to capture or abandonment in the combat zone, will be undertaken by the branch or service only when, in the judgment of the unit command concerned, such action is necessary in accordance with orders of, or policy established by, the army commander.

b. The information which follows is for guidance only. Certain portions of the procedures outlined require the use of explosives and incendiary grenades which normally may not be authorized items of issue to the using organization. The issue of these and related materials, and the conditions under which destruction will be effected, are command decisions in each case, according to the tactical situation. Of the several means of destruction, those most generally applicable are

Mechanical—Requires axe, pick mattock, sledge, crowbar, or similar implement.

Burning —Requires gasoline, oil, incendiary grenades, or other flammables, or welding or cutting torch.

[1] Demolition—Requires suitable explosives or ammunition.

[1] Gunfire —Includes artillery, machine guns, rifles, using rifle grenades, and launchers using antitank rockets. Under some circumstances hand grenades may be used.

Disposal —Requires burying in the ground, dumping in streams or marshes, or scattering so widely as to preclude recovery of essential parts. In general, destruction of essential parts, followed by burning will usually be sufficient to render the materiel useless. However, selection of the particular method of destruction requires imagination and resourcefulness in the utilization of the facilities at hand under the existing conditions. Time is usually critical.

c. If destruction to prevent enemy use is resorted to, the materiel must be so badly damaged that it cannot be restored to a usable condition in the combat zone either by repair or cannibalization. Adequate destruction requires that all parts essential to the operation of the materiel, including essential spare parts, be destroyed or damaged beyond repair. However, when lack of time and personnel prevents destruction of all parts, priority is given to the destruction of those parts most difficult to replace. Equally important, the same essential parts must be destroyed on all like materiel so that the enemy cannot construct one complete unit from several damaged ones.

d. If destruction by demolition or gunfire is directed, due consideration should be given to the observance of appropriate safety precautions.

[1] Generally applicable only when the aiming circle M1 is to be destroyed in conjunction with other equipment.

7-6. Destruction of the Aiming Circle, M1

a. Method No. 1—By Mechanical Means.

(1) Remove the aiming circle M1 and tripod from their carrying case.

(2) Using an axe, pick mattock, sledge, or other heavy implement, destroy the aiming circle M1 and tripod by smashing the main housing, optical elements, legs, adjusting screws, and controls. Elapsed time: about 3 minutes.

b. Method No. 2—By Burning.

(1) Remove the aiming circle M1 and tripod from their carrying case.

(2) Using a welding or cutting torch, burn the main housing, legs, adjusting screws, and controls. Elapsed time: about 3 minutes.

(3) In the absence of a welding or cutting torch, place the aiming circle M1, w/e on a pile of combustible materiel. Pour gasoline or oil over the combustible materiel and over the aiming circle M1 and tripod. Ignite and take cover. A hot fire is required to render the materiel useless.

Caution: **When igniting gasoline, due consideration should be given to the highly flammable nature of gasoline and its vapor. Carelessness in its use may result in painful burns. Elapsed time: about 2 minutes.**

c. Method No. 3—By Disposal. Bury the aiming circle M1 and tripod in a suitable hole or throw them into a stream. Elapsed time: about 3 minutes.

APPENDIX A

REFERENCES

A-1. Publication Indexes

The following publication indexes should be consulted frequently for latest changes or revisions of references given in the appendix and for new publications relating to materiel covered in this technical manual.

Index of Administrative Publications ..... DA Pam 310-1
Index of Blank Forms ..... DA Pam 310-2
Index of Supply Catalogs and Supply Manuals ..... DA Pam 310-6
(Excluding types 7, 8, and 9)
Index of Technical Manuals, Technical Bulletins, ... DA Pam 310-4
Supply Bulletins, Supply Manuals (types 7, 8, and 9) and Lubrication Orders
Index of Doctrinal Training and Organizational Publications ..... DA Pam 310-3
U. S. Army Index of Modification Work Orders ..... DA Pam 310-7

A-2. Supply Manuals

The following Department of the Army Supply Manuals pertain to repair and overhaul of this materiel.

Brushes, Paints, Sealers, and Adhesives ..... SM 9-1-800
Chemicals and Chemical Products ..... SM 9-1-6800
Containers, Packaging and Packing Supplies ..... SM 9-1-8100
Fuels, Lubricants, Oils and Waxes ..... SM 10-1-9100
Hardware and Abrasives ..... SM 9-1-65300
Measuring Tools ..... SM 9-1-5200

A-3. Forms

The following forms pertain to this materiel:

DA Form 9-1, Materiel Inspection Tag
DA Form 9-79, Parts Requisition
DA Form 829, Rejection Memorandum
DA Form 1296, Stock Accounting Record
DA Form 1297, Title Insert (Formal Accountability)
DA Form 1546, Request for Issue or Turn—In
DA Form 2028, Recommended Changes to DA Publications
DA Form 2402, Exchange Tag
DA Form 2404, Equipment Inspection and Maintenance Worksheet
DA Form 2405, Maintenance Request Register
DA Form 2407, Maintenance Request
DA Form 6, Report of Damage or Improper Shipment
DD Form 250, Materiel Inspection and Receiving Report

A-4. Other Publications

a. Destruction to Prevent Enemy Use.

Explosives and Demolitions ..... FM 5-25

b. Camouflage.

Camouflage, Basic Principles and Field Camouflage ..... FM 5-20

c. General.

Authorized Abbreviations and Brevity Code	AR 320-50
Dictionary of United States Army Terms	AR 320-5
Military Training Management	FM 21-5
Military Symbols	FM 21-30
Techniques of Military Training	FM 21-6
First Aid for Soldiers	FM 21-11
Logistics (General): Malfunction involving Ammunitions and Explosives	AR 700-1300-8
Painting Instructions for Field Use	TM 9-213
Principles of Fire Control Materiel	TM 9-3305-2
Safety: Accident Reporting and Records	AR 385-40
Shop Mathematics	TM 9-2820
The Army Equipment Record System and Procedure	TM 38-750

d. Maintenance.

Adhesive, Epoxy Resin Metal to Metal Structural Bonding	MIL-A-8623
Cleaning of Ordnance Materiel	TM 9-208-1
Command Maintenance Management Inspections	AR 750-8
Finishing of Metal and Wood Surfaces	MIL-STD-171
General Maintenance Procedures for Fire Control Materiel	TM 9-254
Grease, Aircraft and Instrument (for low and high Temperatures)	MIL-G-23827
Lubrication of Ordnance Materiel	TM 9-273
Lubricating Oil, Instrument, Aircraft, Low Volatility	MIL-L-6085
Materials, Used for Cleaning, Preserving, Abrading and Cementing Ordnance Materiel; and Related Materials Including Chemicals	TM 9-247
Painting and Finishing Systems for Fire Control Instruments	MIL-STD-194
Painting Instruction for Field Use	TM 9-213
Coating of Glass Optical Elements	MIL-C-6075
Sealing Compound, Adhesive, Curing (Polysulfide Base)	MIL-S-11031
Sealing Compound, Non-Curing (Polysulfide Base)	MIL-S-11030
Use and Care of Hand Tools and Measuring Tools	TM 9-243

e. Operation.

Northern Operations	FM 31-71
Operation and Maintenance of Army Materiel in Extreme Cold Weather 0° to −65° F	TM 9-207
Data Sheets for Ordnance Type Materiel	TM 9-500

f. Shipment and Storage.

Paper, Lens Tissue, Antitarnish Wrapping	MIL-P-13988
Preservation, Methods of	MIL-P-116C
Preservation, Packaging, Packing and Marking of Items of Supply	AR 700-15
Protection of Ordnance General Supplies in Open Storage	TB ORD 379
Report of Packaging and Handling Deficiencies	AR 700-58
Requisitioning, Receipt and Issue System	AR 725-50
Standards for Oversea Shipment and Domestic Issue of Ordnance Material Othan Than Ammunition and Army Aircraft Storage and Materials Handling	TB ORD 385
	TM 743 200-1

APPENDIX B

COMBINED ORGANIZATIONAL, DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS LIST

Section I. INTRODUCTION

B-1. Scope

This appendix lists basic issue items, repair parts, special tools, and equipment required for the performance of organizational, direct support, general support, and depot maintenance of the aiming circle M1, w/e.

B-2. General

This Basic Issue Items, Repair Parts, and Special Tools List is divided into the following sections:

a. Basic Issue Items—Section II. A list of items which accompany the aiming circle and are required by the operator crew for installation, operation or maintenance.

Note. Maintenance and operator's supplies, prescribed load allowance (PLA), repair parts, and special tools and support equipment for organizational maintenance are not applicable.

b. Repair Parts—Section III. A list of repair parts authorized for the performance of maintenance at the direct support, general support, and depot level in figure and item number sequence.

c. Special Tools, Test and Support Equipment—Section IV. A list of special tools, test and support equipment authorized for the performance at the direct support, general support, and depot level.

d. Federal Stock Number and Reference Number Index—Section V. A list of Federal stock numbers in ascending numerical sequence, followed by a list of reference numbers appearing in all the listings, in ascending alpha-numeric sequence, cross-referenced to the illustration figure number and item number.

B-3. Explanation of Columns

The following provides an explanation of columns in the tabular lists in Section II through IV:

a. Source, Maintenance, and Recoverability Codes (SMR).

(1) *Source Code.* Indicates the selection status and source for the listed item. Source codes used are:

CODE	*EXPLANATION*
P	Repair parts which are stocked in or supplied from the GSA/DSA, or Army supply system, and authorized for use at indicated maintenance categories.
M	Repair parts which are not procured or stocked, but are manufactured at indicated maintenance categories.
A	Assemblies which are not procured or stocked as such but are made up of two or more units, each of which carry individual stock numbers and descriptions and are procured and stocked and can be assembled by units at indicated maintenance categories.
X	Parts and assemblies which are not procured or stocked; the mortality of which is normally below that of the applicable end item; and the failure of which should result in retirement of the end item from the supply system.
X1	Repair parts which are not procured or stocked, the requirements for which will be supplied by use of next higher assembly or component.
X2	Repair parts which are not stocked. The indicated maintenance category requiring such repair parts will attempt to obtain through cannibalization; if not obtainable through cannibalization, such repair parts will be requisitioned with supporting justification through normal supply channels.
C	Repair parts authorized for local procurement. When not obtainable from local procurement, such repair parts will be requisitioned

CODE	EXPLANATION
	through normal supply channels with a supporting statement of nonavailability from local procurement.
G	Major assemblies that are procured with PEMA funds for initial issue only to be used as exchange assemblies at DSU and GSU level. These assemblies will not be stocked above DSU and GSU level or returned to Depot supply level.

(2) *Maintenance Codes.* Indicate the lowest category of maintenance authorized to install the listed item. The maintenance level codes are:

CODE	EXPLANATION
C	Operator/crew
O	Organizational maintenance
F	Direct support maintenance
H	General support maintenance
D	Depot maintenance

(3) *Recoverability Codes.* Indicate whether unserviceable items should be returned for recovery or salvage. Items not coded are expendable. Recoverability codes are:

CODE	EXPLANATION
R	Repair parts and assemblies which are economically repairable at DSU and GSU activities and are normally furnished by supply on an exchange basis.
T	High dollar value recoverable repair parts which are subject to special handling and are issued on an exchange basis. Such repair parts are normally repaired or overhauled at depot maintenance activities.
U	Repair parts specifically selected for salvage by reclamation units, because of precious metal content, critical materiels, high dollar value reusable casings, etc.
	Parts will be considered expendable.
	No code indicated.

b. Federal Stock Numbers. Indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. Description. Indicates the Federal item name and any additional description of the item required. The abbreviation "w/e" when used as part of the nomenclature, indicates the Federal stock number includes all armament, equipment, accessories, and repair parts issued with the item. A part number or other reference number is followed by the applicable five-digit Federal supply code for manufacturers in parentheses. Repair parts quantities included in the kits, sets, and assemblies are shown in front of the repair part name.

d. Unit of Measure (U/M). A 2 character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based, e.g., ft, ea, pr, etc.

e. Quantity Incorporated in Unit. Indicates the quantity of the item used in the assembly group.

f. Quantity furnished with the Equipment. Indicates the quantity of an item furnished with the equipment (BIIL only).

g. 15-Day Organizational Maintenance Allowance. Not applicable.

h. 30-Days DS/GS Maintenance Allowances.

Note. Allowances in GS column are for GS maintenance only.

(1) The allowance columns are divided into three subcolumns. Indicated in each subcolumn, opposite the first appearance of each item, is the total quantity of items authorized for the number of equipments supported. Subsequent appearances of the same item will have no entry in the allowance column but will have in the description column a reference to the first appearance of the item. Items authorized for use as required but not for initial stockage are identified with an asterisk in the allowance column.

(2) The quantitative allowances for DS/GS levels of maintenance will represent initial stockage for a 30-day period for the number of equipments supported.

(3) Determination of the total quantity of parts required for maintenance of more than 100 of these equipments can be accomplished by converting the equipment quantity to a decimal factor by placing a decimal point before the next to last digit of the number to indicate hundredths, and multiplying the decimal factor by the parts quantity authorized in the 51–100 allowance column.

Example; authorized allowance for 51–100 equipments is 40; for 150 equipments multiply 40 by 1.50 or 60 parts required.

i. 1-Year Allowances Per 100 Equipments/ Contingency Planning Purposes. Indicates opposite the first appearance of each item the total quantity required for distribution and contingency planning purposes. The range of items indicates total quantities of all authorized items required to provide for adequate support of 100 equipments for one year.

j. Depot Maintenance Allowance Per 100 Equipments. Indicates opposite the first appearance of

each item the total quantity authorized for depot maintenance of 100 equipments. Subsequent appearances of the same item will have no entry in the column, but will have in the description column a reference to the first appearance of the item. Items authorized for use but not for initial stockage are identified with an asterisk in the allowance column.

k. Illustration.

(1) *Figure Number.* Indicates the figure number of the illustration in which the item is shown.

(2) *Item Number.* Indicates the callout number used to reference the item in the illustration.

B-4. Special Information

a. Repair parts mortality has been based on eight hours operations per day.

b. The basis of issue for authorized special tools, test and support equipment is the number of end items of equipment supported and the number of maintenance personnel allocated to perform the required maintenance.

c. In the Direct Support and/or General Support Repair Parts List, the quantity shown in the column headed 30-Day Maint Allowance is computed on the basis of 1-20, 21-50, 51-100, equipments authorized to the direct support and/or general support company. Other allowance columns are blank.

d. Parts which require manufacture or assembly at a category higher than that authorized for installation will indicate in the source column the higher category.

B-5. How to Locate Repair Parts

a. When Federal stock number or reference number is unknown:

(1) *First.* Using the table of contents determine the assembly group or subassembly group, within which the repair part belongs. This is necessary since illustrations are prepared for assembly groups or sub groups, and listings are divided into the same groups.

(2) *Second.* Find the illustration covering the assembly group or sub group to which the repair part belongs.

(3) *Third.* Identify the repair part on the illustration and note the illustration figure and item number of the repair part.

(4) *Fourth.* Using the Repair Parts Listing, find the assembly group or sub group to which the repair part belongs and locate the illustration figure and item number located on the illustration.

b. When Federal stock number or reference number is known:

(1) *First.* Using the Index of Federal Stock Numbers and Reference Numbers find the pertinent Federal stock or reference number. This index is in ascending FSN sequence followed by a list of reference numbers in alpha-numeric sequence, cross referenced to the illustration figure number and item number.

(2) *Second.* Using the Repair Part Listing, find the assembly group or sub group, of the repair part and the illustration figure number and item number, referenced in the Index of Federal Stock Numbers and Reference Numbers.

B-6. Abbreviations

	Explanation
AL-ALLOY	ALUMINUM ALLOY
assy	assembly
br	brass
bz	bronze
cone-pt	cone point
corr-res-s	corrosion-resistant-steel
cyl	cylinder
diam	diameter
dld	drilled
dog-pt	dog point
fil-hd	fillister head
fin	finish
fl-fil-hd	flat fillibuster head
fl-hd	flat head
fl-pt	flat point
gr	grade
hdls	headless
ID	inside diameter
int-teeth	internal teeth
lg	long
NF	National Fine Thread
ni-sil	nickel silver
NS	National Form Thread, Special Pitch
OD	outside diameter
oval-fil-hd	oval fillister head
p-bz	phosphor bronze
rd	round
ru	rubber
S	steel
SP	special
thk	thick
tm-pltd	tim plated
univ-hd	universal head
UNF	unified national fine thread
wd	wide

B-7. Federal Supply Codes for Manufacturers

Codes	Manufacturer
19200	Frankford Arsenal, Philadelphia, Pa.
21450	Ordnance Corps Engineering Standards, Rock Island Arsenal, Rock Island, Illinois
96906	Military Specification Promulgated by Standardization Division, Directorate of Logistic Services USA

Section II. BASIC ISSUE ITEMS

(1) Source Maint and Recov Code			(2) Federal Stock Number	(3) Description Ref No. & Mfr. Code — Usable on Code	(4) Unit of Meas	(5) Qty Inc in Unit	(6) Qty Furn With Equip	(7) Illustration	
(A) Source	(B) Maint	(C) Recov						(A) Figure No.	(B) Item No.
				MAJOR COMBINATION					
			1290-671-6145	AIMING CIRCLE: M1 w/e (6716145)	ea	....	....	1-1	....
				COMPONENT OF MAJOR COMBINATION					
				AIMING CIRCLE: M1 (7579919)	ea	....	....	1-1	....
				TOOLS AND EQUIPMENT FOR MAJOR COMBINATION					
P	F	..	1290-652-8676	CASE, CARRYING: M6A1 (6528676)	ea	1	1	1-1	....
P	F	..	1290-658-2649	COVER, AIMING CIRCLE: M409 (6582649)	ea	1	1	1-1	....
P	F	..	1290-652-9317	LIGHT, INSTRUMENT: M2 (6529317)	ea	1	1	1-1	....
P	F	..	1290-652-8560	TRIPOD: M5 (6528560)	ea	1	1	1-1	....
				REPAIR PARTS TOOLS AND EQUIPMENT FOR					
				CASE, CARRYING: M6A1 None authorized					
				COVER, AIMING CIRCLE: M409 None authorized					
				LIGHT INSTRUMENT: M2					
P	O	..	6135-120-1020	BATTERY, DRY: 1.5V fl-surface term cyl 1-5/16 dia 2-3/8 HO/A	ea	1	1	B22	6
P	F	..	6240-635-9800	LAMP, INCANDESCENT: 7.3 V, 0.19 amp, sgle-fil No. 325 sgle-contact No. 10(0.190)-64NS-2 base, T-1-1/4 blub C-2R fil fed W-L-111B	ea	2	2	B22	9
			1290-652-8560	TRIPOD: M5 None authorized					
				APPLICABLE CLEANING AND PRESERVING MATERIALS					
P	O	..	8020-224-8022	BRUSH, ARTIST'S rd, taper-pt, camel's hair, size No. 1, dia 1/8 in., lg of bristles 5/8 lg overall 7 1/2 in., Fed Spec-UU-B-118-A	ea	1	1	....	....
P	O	..	6810-264-6614	ETHYL, ALCOHOL, TECHNICAL: USP 95% (JAN-A-463 gri) 1 gal	gal	....	....	....	....
P	O	..	6640-285-4694	PAPER LENS: FED SPEC UU-P-313E (100 sheet book)	bx	1	1	....	....

(1) SMR CODE (A) SOURCE	(B) MAINT	(C) RECOV	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION Reference Number & Mfr Code / Usable On Code	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (A) 1-20	(B) 21-50	(C) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (A) 1-20	(B) 21-50	(C) 51-100	(8) 1-YR ALW PER 100 EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATION (A) FIG. NO.	(B) ITEM NO.
			1290-671-6145	**AIMING CIRCLE M1, W/E** 6716145 (19200)												
				COMPOSED OF:												
X1	--	--	---	AIMING CIRCLE M1 7579919 (19200)	ea	1	--	--	--	--	--	--	--	--	1-1	--
P	F	--	1290-652-8676	CASE, CARRYING M6A1 6528676 (19200)	ea	1	*	1	1	*	1	1	6	4	1-1	--
P	F	--	1290-658-2649	COVER, AIMING CIRCLE M409 6582649 (19200)	ea	1	*	1	1	*	1	1	6	4	1-1	--
P	F	--	1290-652-9317	LIGHT, INSTRUMENT M2 6529317 (19200)	ea	1	*	1	1	*	1	1	6	4	1-1	--
P	F	--	1290-652-8560	TRIPOD M5 6528560 (19200)	ea	1	*	1	1	*	1	1	6	4	1-1	--
				AZIMUTH AND ORIENTING MECHANISMS												
P	F	--	5305-206-8732	SCREW, MACHINE, SPECIAL FL-FIL-HD, BR, 1/4-28 NF—2 x 5/16 OVERALL 5039611 (19200)	ea	1	*	*	2	*	*	2	10	10	B1	1
P	F	--	5310-503-9612	WASHER, SPRING, TENSION P-BZ, 5/16 ID, 0.51 OD, 0.032 THK 5039612 (19200)	ea	1	*	*	2	*	*	2	10	10	B1	2
X1	--	--	---	ORIENTING MECHANISM, WITH HOUSING 5544750 (19200)	ea	1	--	--	--	-	--	--	--	--	B1	3
X1	--	--	---	BODY ASSEMBLY, MAIN, WITH AZIMUTH MECHANISM 6528553 (19200)	ea	1	--	--	--	--	--	--	--	--	B1	4
X1	--	--	---	TELESCOPE ASSEMBLY 6528551 (19200)	ea	1	--	--	--	--	--	--	--	--	B1	5
				TELESCOPE AND MAIN BODY ASSEMBLIES												
P	F	--	5305-282-7675	SETSCREW HDLS, FL-PT, CORR-RES-S, No. 0 (0.060) 80 NF-2A x 3/32 MS51056-2 (96906)	ea	1	*	*	2	*	*	2	10	8	B2	1

Section III. REPAIR PARTS

(1) SMR CODE (A) SOURCE	(B) MAINT	(C) RECOV	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION Reference Number & Mfr Code / Usable On Code	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (A) 1-20	(B) 21-50	(C) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (A) 1-20	(B) 21-50	(C) 51-100	(8) 1-YR ALW PER 100 EQUIP CNT-GCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATION (A) FIG. NO.	(B) ITEM NO.
P	F	--	5305-337-5831	SCREW, ELEVATING P-BZ, 1/4-40 NS 3 x 1.28 OVERALL 5039592 (19200)	ea	1	*	*	2	*	*	2	10	10	B2	2
X1	--	--	---	PLUG, SLOTTED BR, 11/32-36 NS-3 x 0.44 OVERALL 5039597 (19200)	ea	1	--	--	--	--	--	--	--	--	B2	3
X1	--	--	---	BODY ASSEMBLY, MAIN 6528553 (19200)	ea	1	--	--	--	--	--	--	--	--	B2	4
P	F	--	5340-201-1492	SPRING, COMPRESSION, HELICAL 5043923 (19200)	ea	1	*	*	2	*	*	2	10	8	B2	5
P	F	--	5305-282-7643	SETSCREW HDLS, FL-PT, CRES, No. 2-64 NF-2A 1/16 LG 540880 (19200)	ea	1	*	*	2	*	*	2	10	8	B2	6
P	H	--	5305-207-7564	SCREW, SPECIAL OVAL-FIL-HD, BR, No. 10-32 NF-3, 9/32 LG 5039594 (19200)	ea	2	--	--	--	*	*	2	10	10	B2	7
P	H	--	5305-550-3844	SCREW, SPECIAL OVAL-FIL-HD, BR, No. 10-32 NF-3, 9/32 LG 7596930 (19200)	ea	2	--	--	--	*	*	2	5	5	B2	8
P	H	--	5310-527-3288	WASHER, LOCK INT-TEETH, P-BZ, TN-PLTD No. 10 SCREW SIZE MS35333-22 (96906)	ea	2	--	--	--	*	*	2	8	10	B2	9
P	H	--	1290-504-3889	BRACKET, SUPPORT, TELESCOPE 5043889 (19200)	ea	1	--	--	--	*	*	2	5	5	B2	10
X1	--	--	---	TELESCOPE ASSEMBLY 6528551 (19200)	ea	1	--	--	--	--	--	--	--	--	B2	11
P	F	--	5315-187-3226	PIN, TAPERED, PLAIN CRES, No. 6/0 (0.078), 3/8 LG MS24692-027 (96906)	ea	1	*	*	2	*	*	2	10	8	B2	12
P	F	--	5355-503-9593	KNOB NI-SIL, 1 1/16 OD, 0.375 LG 5039593 (19200)	ea	1	*	*	2	*	*	2	5	5	B2	13
P	F	--	5305-282-7659	SETSCREW HDLS, SLOTTED CONE-PT, CRES	ea	1	*	*	2	*	*	2	10	8	B2	14

				No. 1 (0.073)-72 NF-A2, 3/32 LG MS51059-008 (96906)																		
P	F	..	5340-597-8857	RING, RETAINING SLOTTED, BR 0.191 ID, 11/32-36 NS-3 OD, 0.12 THK 5039917 (19200)	ea	1	*	*	2	*	*	2	10	8	B2	15
				MAGNETIC NEEDLE, BODY ASSEMBLY AND ASSOCIATED PARTS																		
P	F	..	5305-050-3882	SETSCREW HDLS, FL-PT, CRES No. 2-64 NF-2A, 1/4 LG MS51056-22 (96906)	ea	1	*	*	2	*	*	2	10	8	B3	1
P	F	..	1240-503-9629	PIECE, END, REAR, DECLINATOR 5039629 (19200)	ea	1	*	*	2	*	*	2	5	5	B3	2
P	H	..	1290-348-5937	GASKET, VINYLITE 17/64 WD, 2-31/64 LG, 0.006 THK 7586316 (19200)	ea	1	..	..	..	*	*	2	10	10	B3	3
X1	..	..	---	BODY ASSEMBLY, MAIN 6528553 (19200)	ea	1	..	..	..	..	..	..	..	..	B3	4
P	H	..	1290-765-0540	WINDOW, MAGNETIC NEEDLE 7650540 (19200)	ea	1	..	..	..	*	*	2	10	8	B3	5
P	F	..	1290-612-9653	NEEDLE, MAGNETIC 6129653 (19200)	ea	1	*	*	2	*	*	2	10	10	B3	6
P	H	..	5305-758-6059	SCREW, FIL-HD No. 1-72 NF-3 x 1/8 LG 7586059 (19200)	ea	1	..	..	..	*	*	2	10	10	B3	7
P	F	..	1290-503-9631	STRIP, NOTATION 5/16 W x 1 1/2 LG x 0.4 THK 5039631 (19200)	ea	1	*	*	2	*	*	2	5	5	B3	8
				BODY ASSEMBLY																		
P	F	..	1290-503-9632	PLUNGER, RELEASING, MAGNETIC NEEDLE 0.89 LG 5039632 (19200)	ea	1	*	*	2	*	*	2	5	5	B4	1
P	F	..	5310-758-7538	WASHER, FLAT BR, 0.135 ID, 0.288 OD, 0.015 THK 7587538 (19200)	ea	2	*	*	2	*	*	2	10	8	B4	2
P	F	..	5330-297-0489	WASHER, RUBBER COMPOUND 0.117 ID, 0.290 OD, 1/8 THK 7587539 (19200)	ea	1	*	*	2	*	*	2	10	8	B4	3
P	F	..	1290-758-6310	PLUNGER, LOCKING, MAGNETIC	ea	1	*	*	2	*	*	2	5	5	B4	4

Section III. REPAIR PARTS

(1) SMR CODE (A) SOURCE	(B) MAINT	(C) RECOV	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION Reference Number & Mfr Code — Usable On Code	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (A) 1-20	(B) 21-50	(C) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (A) 1-20	(B) 21-50	(C) 51-100	(8) 1-YR ALW PER 100 EQUIP CNT-GCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATION (A) FIG. NO.	(B) ITEM NO.
				NEEDLE 7586310 (19200)												
P	H	..	1290-503-9595	YOKE, MAGNETIC NEEDLE PLUNGER 5039595 (19200)	ea	1	..	..	..	*	*	2	5	5	B4	5
P	H	..	1290-764-4665	SPRING, LOCKING, MAGNETIC NEEDLE 7644665 (19200)	ea	1	..	..	..	*	*	2	5	5	B4	6
P	F	..	3110-151-9157	BALLBEARING BR, 1/8 in MS19062-3 (96906)	ea	1	*	*	2	*	*	2	10	8	B4	7
P	H	..	5340-201-1496	SPRING, COMPRESSION, P-BZ SPRING WIRE, 0.020 DIAM STOCK, 0.115 OD, 0.20 LG, 6 1/2 IN. COIL. 5032984 (19200)	ea	1	..	..	..	*	*	2	10	8	B4	8
P	F	..	...	SCREW, MACHINE, FL-HD, BR, PLAIN FIN No. 0 (0.060)-80 NF-2A x 3/16 LG MS35246-2 (96906)	ea	5	*	*	2	*	*	2	10	8	B4	9
P	F	..	5355-503-9627	POINTER, DIAL 5039627 (19200)	ea	1	*	*	2	*	*	2	5	5	B4	10
X1	..	..	...	BODY ASSEMBLY, MAIN 6528553 (19200)	ea	1	..	..	..	..	..	..	..	..	B4	11
P	F	..	5305-050-4188	SCREW, MACHINE, FIL-HD, BR, PLAIN FIN, No. 0 (0.060)-80 NF-2A x 5/32 LG 504188 (19200)	ea	2	*	*	2	*	*	2	6	8	B4	12
P	H	..	1290-503-9190	PIVOT, MAGNETIC NEEDLE 5039190 (19200)	ea	1	..	..	..	*	*	2	5	10	B4	13
X1	..	..	...	VIAL, LEVEL ASSEMBLY CIRCULAR TYPE CA-1 7635924 (19200)	ea	1	..	..	..	..	..	..	..	..	B4	14
P	H	..	5330-298-5472	WASHER, RUBBER COMPOUND 7591318 (19200)	ea	1	..	..	..	*	*	2	10	8	B4	15
				CIRCULAR LEVEL VIAL ASSEMBLY												
P	H	..	5305-206-7326	SCREW, SPECIAL HDLS, CONE-PT, NI-SIL	ea	3	..	..	..	*	*	2	10	10	B5	1

				No. 1-72 NF-3, 5/32 LG 5043926 (19200)												
X1	..	..	...	CAP, CIRCULAR LEVEL VIA 5047837 (19200)	ea	1	..	..	..	..	..	..	..	..	B5	2
X1	..	..	...	SUPPORT, CIRCULAR LEVEL VIAL 7579205 (19200)	ea	1	..	..	..	..	..	..	..	..	B5	3
X1	..	..	...	WASHER, RUBBER COMPOUND 0.117 ID, 0.290 OD, 1/8 THK 5047839 (19200)	ea	1	..	..	..	..	..	..	..	..	B5	4
X1	..	..	...	VIAL, LEVEL CIRCULAR TYPE CA-1 MS35106-1 (96906)	ea	1	..	..	..	..	..	..	..	..	B5	5
				MAGNETIC NEEDLE MAGNIFIER ASSEMBLY												
P	F	..	5305-543-4323	SCREW, MACHINE FIL-HD, CRES, No. 2-64 NF-2A, 1/4 LG MS35234-3 (96906)	ea	1	*	*	2	*	*	2	10	8	B6	1
X1	..	..	...	PIECE, END, REAR, DECLINATOR 5544995 (19200)	ea	1	..	..	..	..	..	..	..	..	B6	2
X1	..	..	...	BODY ASSEMBLY, MAIN 6528553 (19200)	ea	1	..	..	..	..	..	..	..	..	B6	3
P	F	..	1290-348-5936	GASKET, VINYLITE 0.59 WD, 2-27/64 LG, 0.006 THK 7586315 (19200)	ea	1	*	*	2	*	*	2	10	10	B6	4
P	F	..	5305-050-4043	SCREW, MACHINE FIL-HD, CRES, No. 2-64 NF-3, 5/32 LG 504043 (19200)	ea	1	*	1	2	*	1	2	10	8	B6	5
P	F	..	1290-504-3927	SHOE, CLAMPING MAGNETIC NEEDLE RETICLE HOLDER 5043927 (19200)	ea	1	*	*	2	*	*	2	5	5	B6	6
P	F	..	5305-050-3882	SETSCREW HDLS, FL-PT, CRES No. 2-64 NF-2A, 1/4 LG MS51056-22 (96906) (INITIALLY LISTED AS FIGURE B3, ITEM 1)	ea	1	..	..	..	..	..	..	..	..	B6	7
P	F	..	1290-504-3928	HOLDER, MAGNETIC NEEDLE RETICLE 5043928 (19200)	ea	1	*	*	2	*	*	2	5	5	B6	8
P	F	..	1290-503-9633	RETICLE, MAGNETIC NEEDLE 5039633 (19200)	ea	1	*	*	2	*	*	2	5	5	B6	9
P	F	..	1290-613-5660	MAGNIFIER ASSEMBLY 6135660 (19200)	ea	1	*	*	2	*	*	2	5	5	B6	10

Section III. REPAIR PARTS

(1) SMR CODE (A) SOURCE	(B) MAINT	(C) RECOV	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION Reference Number & Mfr Code / Usable On Code	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (A) 1–20	(B) 21–50	(C) 51–100	(7) 30-DAY GS MAINT ALLOWANCE (A) 1–20	(B) 21–50	(C) 51–100	(8) 1-YR ALW PER 100 EQUIP CNT-GCY	(9) DEPOT MAINT PER ALW 100 EQUIP	(10) ILLUSTRATION (A) FIG. NO.	(B) ITEM NO.
				MAGNETIC NEEDLE MAGNIFIER ASSEMBLY												
X1	--	--	---	LENS 5043924 (19200)	ea	2	--	--	--	--	--	--	--	--	B7	1
X1	--	--	---	CELL 5043925 (19200)	ea	1	--	--	--	--	--	--	--	--	B7	2
X1	--	--	---	SEPARATOR 5039637 (19200)	ea	2	--	--	--	--	--	--	--	--	B7	3
				AZIMUTH WORM ASSEMBLY												
P	F	--	5315-187-3256	PIN, TAPERED, PLAIN CRES, No. 4/0 (0.109) x 5/8 LG MS24692-081 (96906)	ea	1	*	*	2	*	*	2	10	8	B8	1
P	F	--	5355-503-9613	KNOB NI-SIL, 15/16 OD, 5/8 LG 5039613 (19200)	ea	1	*	*	2	*	*	2	5	5	B8	2
P	F	--	5305-582-9067	SETSCREW, SLOTTED No. 2-64 NF-2A, 3/32 LG HDLS, FL-PT, CRES 5829064 (96906)	ea	1	*	*	2	*	*	2	10	8	B8	3
P	H	--	1290-692-1515	SEAT, BALL SOCKET CAP 7/16 7680256 (19200)	ea	1	--	--	--	*	1	1	8	6	B8	4
P	F	--	5305-758-4007	SCREW, SPECIAL, HDLS, DOG, PT, BR, No. 2-64 NF-3, 0.110 LG 7584007 (19200)	ea	1	*	*	2	*	*	2	5	5	B8	5
P	H	--	1290-513-2032	SEAT, BALL SOCKET CAP 7680260 (19200)	ea	1	--	--	--	*	*	2	8	6	B8	6
P	F	--	5305-022-5415	SCREW, MACHINE FIL-HD, CRES, PASS-FIN, No. 5-44 NF-2A, 1/4 LG 225415 (19200)	ea	3	*	*	2	*	*	2	10	10	B8	7
P	F	--	1290-503-9622	DISK, CLAMPING 27/32 OD, 0.064 THK 5039622 (19200)	ea	1	*	*	2	*	*	2	8	6	B8	8

P	F	--	1290-503-9621	DIAL, MICROMETER SCALE 5039621 (19200)	ea	1	*	*	2	*	*	2	5	5	B8	9
X1	--	--	---	DRUM, SPACER (MICROMETER) 5039620 (19200)	ea	1	--	--	--	--	--	--	--	--	B8	10
P	H	--	1290-503-9619	ADAPTER, AZIMUTH MICROMETER 5039619 (19200)	ea	1	--	--	--	*	*	2	5	5	B8	11
P	F	--	5305-187-3254	PIN, TAPERED, PLAIN CRES, CORR-RES-S, No. 4/0 (0.109), 1/2 LG MS24692-78 (96906)	ea	2	*	*	2	*	*	2	10	8	B8	12
P	F	--	5305-801-7752	SCREW, MACHINE, FIL-HD, CRES, No. 1-72 NF-2A, 1/8 LG 504029 (19200)	ea	2	*	*	2	*	*	2	10	8	B8	13
P	F	--	1290-053-9628	PLATE, AZIMUTH MICROMETER DESIGNATION 5039628 (19200)	ea	1	*	*	2	*	*	2	5	5	B8	14
P	F	--	1290-612-9649	SHOE, THROWOUT AZIMUTH WORM 6129649 (19200)	ea	1	*	*	2	*	*	2	5	5	B8	15
P	F	--	5305-758-3596	SETSCREW, SPECIAL HDLS, FL-PT, BR No. 2-64 NF-3, 3/64 LG 7583596 (19200)	ea	1	*	*	2	*	*	2	5	5	B8	16
X1	--	--	---	PLUG, SLOTTED AL-ALLOY 15/32-36 NS 3, 0.44 LG 5039625 (19200)	ea	1	--	--	--	--	--	--	--	--	B8	17
P	F	--	5340-201-1491	SPRING, HELICAL, COMPRESSION P-BZ SPRING WIRE, 0.032 DIA STOCK, 0.240 OD, 7/8 LG, 11 COIL 5039345 (19200)	ea	1	*	*	2	*	*	2	10	8	B8	18
P	H	--	1290-503-9624	PLUNGER, AZIMUTH WORM 7/8 LG 5039624 (19200)	ea	1	--	--	--	*	*	2	5	5	B8	19
P	H	--	1290-612-9650	WORM, AZIMUTH 3.665 LG 6129650 (19200)	ea	1	--	--	--	*	*	2	5	5	B8	20
X1	--	--	---	BODY ASSEMBLY, MAIN 6528553 (19200)	ea	1	--	--	--	--	--	--	--	--	B8	21
				ORIENTING MECHANISM AND HOUSING ASSEMBLY												
P	F	--	5305-282-9771	SCREW, CLAMPING, WING BZ, 1/4-28 NF-2, 1-25/32 LG 5039623 (19200)	ea	1	*	*	2	*	*	2	5	5	B9	1
X1	--	--	---	HOUSING, ORIENTING WORM 5544752 (19200)	ea	1	--	--	--	--	--	--	--	--	B9	2

Section III. REPAIR PARTS

(1) SMR CODE (A) SOURCE	(B) MAINT	(C) RECOV	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION Reference Number & Mfr Code / Usable On Code	(4) UNIT OF MEAS	(5) QTY INC NI UNIT	(6) 30-DAY DS MAINT ALLOWANCE (A) 1-20	(B) 21-50	(C) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (A) 1-20	(B) 21-50	(C) 51-100	(8) 1-YR ALW PER 100 EQUIP CNT-GCY	(9) DEPOT MAINT PER ALW 100 EQUIP	(10) ILLUSTRATION (A) FIG. NO.	(B) ITEM NO.
P	F	..	5305-187-3254	PIN, TAPERED, PLAIN CRES, CORR-RES-S No. 4/0 (0.109), 1/2 LG MS24692-78 (96906) (INITIALLY LISTED AS FIGURE B8, ITEM 12)	ea	2	..	..	..	..	..	..	..	..	B9	3
P	F	..	5310-503-9616	NUT, PLAIN, ROUND BR, 1/4-28 UNF-2B, 5/32 THK, DLD 5039616 (19200)	ea	4	*	*	2	*	*	2	5	5	B9	4
P	F	..	5310-503-9617	WASHER, FLAT RD, BR, 17/64 ID, 13/32 OD, 0.051 THK 5039617 (19200)	ea	1	*	*	2	*	*	2	5	5	B9	5
X1	..	..	...	GEAR, WORM BZ, 64 TEETH x 2.625 OD 5544750 (19200)	ea	1	..	..	..	..	..	..	..	..	B9	6
				ORIENTING MECHANISM AND HOUSING ASSEMBLY												
P	F	..	...	PIN, TAPERED, PLAIN CRES, No. 6/0 (0.078), 7/16 LG 544098 (19200)	ea	1	*	*	2	*	*	2	10	8	B10	1
P	F	..	5355-503-9610	KNOB NI-SIL, 3/4 OD, 7/8 LG 5039610 (19200)	ea	2	*	*	2	*	*	2	5	5	B10	2
P	F	..	5330-641-0192	WASHER, FELT NONMETALLIC, 3/16 ID, 7/16 OD, 1/16 THK 5039609 (19200)	ea	2	*	*	2	*	*	2	10	8	B10	3
X1	..	..	...	SCREW, MACHINE FIL-HD, BR, No. 2-64 NF-3, 3/16 LG 5039985 (19200)	ea	4	..	..	..	..	..	..	..	..	B10	4
X1	..	..	...	PLATE AL-ALLOY, 1/2 WIDE, 1-1/2 LG, 0.064 THK 5039604 (19200)	ea	1	..	..	..	..	..	..	..	..	B10	5

P	H	..	5340-503-9605	CLIP, SPRING TENSION P-BZ, 1/4 WD, 1-5/32 LG, 0.025 THK 5039605 (19200)	ea	1	..	..	..	*	*	2	5	5	B10	6
X1	..	..	...	HOUSING, ORIENTING WORM 5544752 (19200)	ea	1	..	..	..	..	..	..	..	..	B10	7
P	F	..	5305-282-7643	SETSCREW HDLS, FL-PT, CRES, No. 2-64 NF-2A, 1/16 LG 540880 (19200) (INITIALLY LISTED AS FIGURE B2, ITEM 6)	ea	1	..	..	..	..	..	..	..	..	B10	8
P	F	..	5305-206-7327	SCREW, SPECIAL HDLS, DOG-PT, BR, No. 2-64 NF-3, 0.080 LG 5183439 (19200)	ea	1	*	*	2	*	*	2	10	10	B10	9
P	H	..	1290-513-2032	SEAT, BALL SOCKET CAP 7680260 (19200) (INITIALLY LISTED AS FIGURE B8, ITEM 6)	ea	1	..	..	..	..	..	..	..	..	B10	10
P	H	..	1290-503-9608	WORM SHAFT, ORIENTING 3-1/16 LG 5039608 (19200)	ea	1	..	..	..	*	*	2	5	5	B10	11
P	H	..	1290-573-2031	SEAT, BALL SOCKET 7680259 (19200)	ea	1	..	..	..	*	*	2	8	6	B10	12
P	H	..	1290-503-9606	PLUNGER P-BZ, 0.2495 DIA, 0.28 LG 5039606 (19200)	ea	1	..	..	..	*	*	2	5	5	B10	13
				TELESCOPE ASSEMBLY												
P	H	..	5305-206-1044	SCREW, SPECIAL OVAL-FIL-HD, BR No. 5-44 NF-3, 5/16 LG 7596929 (19200)	ea	6	..	..	..	1	2	2	10	8	B11	1
X1	..	..	...	COVER, TELESCOPE BODY, FRONT 6129643 (19200)	ea	1	..	..	..	..	..	..	..	..	B11	2
X1	..	..	...	OBJECTIVE, ASSEMBLY 7634874 (19200)	ea	1	..	..	..	..	..	..	..	..	B11	3
X1	..	..	...	COVER, TELESCOPE BODY, REAR 6135637 (19200)	ea	1	..	..	..	..	..	..	..	..	B11	4
X1	..	..	...	EYEPIECE, ASSEMBLY 7634871 (19200)	ea	1	..	..	..	..	..	..	..	..	B11	5
X1	..	..	...	BODY, (PINNED AND MACHINED) 7644365 (19200)	ea	1	..	..	..	..	..	..	..	..	B11	6

Section III. REPAIR PARTS

(1) SMR CODE (A) SOURCE	(B) MAINT	(C) RECOV	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION Reference Number & Mfr Code / Usable On Code	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (A) 1-20	(B) 21-50	(C) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (A) 1-20	(B) 21-50	(C) 51-100	(8) 1-YR ALW PER 100 EQUIP CNT-GCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATION (A) FIG. NO.	(B) ITEM NO.
X1	..	..	...	SETSCREW HDLS, FL-PT No. 1-72 NF-3, 5/32 LG 540926 (19200)	ea	1	..	..	..	..	..	..	..	..	B11	7
				TELESCOPE ASSEMBLY												
P	H	..	1290-504-3887	SPRING, FLAT P-BZ, 9/32 WD, 1.32 LG, 0.025 THK 5043887 (19200)	ea	2	..	..	..	*	*	2	5	5	B12	1
P	H	..	1290-503-1677	PRISM, PORRO 5031677 (19200)	ea	2	..	..	..	*	*	2	5	5	B12	2
X1	..	..	...	BODY (PINNED AND MACHINED) 7644365 (19200)	ea	1	..	..	..	..	..	..	..	..	B12	3
P	H	..	5305-054-0877	SETSCREW HDLS, FL-PT, CRES, No. 1-72 NF-2A, 5/32 LG 1540827 (19200)	ea	1	..	..	..	*	*	2	10	6	B12	4
P	F	..	4730-541-0849	PLUG, SLOTTED AL-ALLOY 0.393-32 NS-3, 3/16 LG 5039591 (19200)	ea	2	*	*	2	*	*	2	5	5	B12	5
P	F	..	1290-067-6407	VIAL, LEVEL TYPE DA-3 MS35102-3 (96906)	ea	1	*	1	2	*	1	2	10	8	B12	6
P	F	..	1240-503-5616	WINDOW, PLATE GLASS 0.186 OD, 0.04 THK (ILLUMINATING, RETICLE) 5035616 (19200)	ea	1	*	*	2	*	*	2	5	5	B12	7
P	F	..	1290-517-7981	DETENT P-BZ, No. 2-64 NF-3, 1-1/64 LG 5177981 (19200)	ea	1	*	*	2	*	*	2	5	5	B12	8
				EYEPIECE ASSEMBLY												
P	F	..	5305-207-8852	SCREW, SPECIAL NI-SIL No. 2-64 NF-3, 0.14 LG 5039589 (19200)	ea	1	*	*	2	*	*	2	10	10	B13	1

P	F	..	5355-503-9590	SLEEVE, FOCUSING, EYEPIECE 5039590 (19200)	ea	1	*	*	2	*	*	2	5	5	B13	2
X1	..	..	...	CELL, LENS, EYEPIECE ASSEMBLY 7634872 (19200)	ea	1	..	..	..	..	..	..	..	..	B13	3
P	H	..	5340-200-5376	RING, RETAINING BR, 0.666 ID, 0.743—48NS-3 OD, 0.11 THK 5039601 (19200)	ea	2	..	..	..	*	*	2	10	6	B13	4
X1	..	..	...	RETICLE, EYEPIECE, ASSEMBLY 7634873 (19200)	ea	1	..	..	..	..	..	..	..	..	B13	5
X1	..	..	...	ADAPTER, EYEPIECE 6135659 (19200)	ea	1	..	..	..	..	..	..	..	..	B13	6
				LENS CELL ASSEMBLY												
P	H	..	5340-200-5376	RING, RETAINING BR, 0.666 ID, 0.743-48NS-3 OD, 0.11 THK 5039601 (19200) (INITIALLY LISTED AS FIGURE B13, ITEM 4)	ea	2	..	..	..	..	..	..	..	..	B14	1
P	H	..	1240-503-1761	LENS, EYEPIECE FIELD OR EYELENS 5037651 (19200)	ea	2	..	..	..	*	*	2	5	5	B14	2
X1	..	..	...	SEPARATOR 5037652 (19200)	ea	1	..	..	..	..	..	..	..	..	B14	3
X1	..	..	...	CELL, LENS, EYEPIECE 5039587 (19200)	ea	1	..	..	..	..	..	..	..	..	B14	4
				RETICLE ASSEMBLY												
P	H	..	...	RING, RETAINING BR, 0.557 ID, 0.648-48NS-3 OD, 0.08 THK 5039586 (19200)	ea	1	..	..	..	*	*	2	10	8	B15	1
X1	..	..	...	CELL, EYEPIECE RETICLE 5039585 (19200)	ea	1	..	..	..	..	..	..	..	..	B15	2
P	H	..	1290-612-9648	RETICLE, EYEPIECE 6129648 (19200)	ea	1	..	..	..	*	*	2	5	5	B15	3
				OBJECTIVE ASSEMBLY												
P	F	..	...	SCREW HDLS, FL-HD No. 1-72 NF-2A x 5/32 LG MS51056-9 (96906)	ea	2	*	*	2	*	*	2	10	8	B16	1
P	H	..	5340-597-8829	RING, RETAINING, SLOTTED BR, 0.87 ID, 0.92-32NS-3 OD, 0.10 THK 5039600 (19200)	ea	1	..	..	..	*	*	2	10	8	B16	2

Section III. REPAIR PARTS

(1) SMR CODE (A) SOURCE	(1) SMR CODE (B) MAINT	(1) SMR CODE (C) RECOV	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION Reference Number & Mfr Code / Usable On Code	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (A) 1-20	(6) (B) 21-50	(6) (C) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (A) 1-20	(7) (B) 21-50	(7) (C) 51-100	(8) 1-YR ALW PER 100 EQUIP CNT-GCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATION (A) FIG. NO.	(10) (B) ITEM NO.
X1	..	..	---	ADAPTER, OBJECTIVE 5039490 (19200)	ea	1	..	..	..	..	..	..	..	..	B16	3
X1	..	..	---	COVER, TELESCOPE BODY, FRONT 6129643 (19200)	ea	1	..	..	..	..	..	..	..	..	B16	5
X1	..	..	---	CELL, OBJECTIVE ASSEMBLY 7634875 (19200)	ea	1	..	..	..	..	..	..	..	..	B16	4
				OBJECTIVE CELL ASSEMBLY												
P	H	..	1290-504-3921	RETAINER, BR, 0.522 TAPERED ID, 0.743-48NS-3 OD, 0.57 LG 5043921 (19200)	ea	1	..	..	..	*	*	2	5	5	B17	1
X1	..	..	---	CELL, OBJECTIVE 5039588 (19200)	ea	1	..	..	..	..	..	..	..	..	B17	2
P	H	..	1240-503-6359	OBJECTIVE LENS 5036359 (19200)	ea	1	..	..	..	*	*	2	5	5	B17	3

Section IV. SPECIAL TOOLS, TEST AND SUPPORT EQUIPMENT

(1) SMR CODE (A) SOURCE	(1) SMR CODE (B) MAINT	(1) SMR CODE (C) RECOV	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION Reference Number & Mfr Code / Usable On Code	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (A) 1-20	(6) (B) 21-50	(6) (C) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (A) 1-20	(7) (B) 21-50	(7) (C) 51-100	(8) 1-YR ALW PER 100 EQUIP GCY CNT-	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATION (A) FIG. NO.	(10) (B) ITEM NO.
				TOOLS AND EQUIPMENT FOR AIMING CIRCLE: M1												
P	F	..	1290-652-8676	CASE, CARRYING M6A1 6528676 (19200) (INITIALLY LISTED IN FIGURE 1-1)	ea	1	..	..	..	..	..	..	..	..	1-1	..
P	F	..	1290-658-2649	COVER, AIMING CIRCLE M409 6582649 (19200) (INITIALLY LISTED IN FIGURE 1-1)	ea	1	..	..	..	..	..	..	..	..	1-1	..
P	F	..	1290-652-9317	LIGHT, INSTRUMENT M2 6529317 (19200) (INITIALLY LISTED IN FIGURE 1-1)	ea	1	..	..	..	..	..	..	..	..	1-1	..

P	F	..	1290-652-8560	TRIPOD M5 6528560 (19200) (INITIALLY LISTED IN FIGURE 1-1)	ea	1	..	..	..	..	..	..	..	..	1-1	..
				REPAIR PARTS FOR TOOLS AND EQUIPMENT TRIPOD M5 ASSEMBLY															
X1	..	..	...	PLUG, TUBE, BR, 0.82-32NS-3 OD, 13/32 THK 5043955 (19200)	ea	1	..	..	..	..	..	..	..	..	B18	1
X1	..	..	...	TUBE, SUPPORT 7651749 (19200)	ea	1	..	..	..	..	..	..	..	..	B18	2
P	F	..	1290-719-9614	HEAD, TRIPOD 7199614 (19200)	ea	1	*	*	2	*	*	2	8	6	B18	3
P	F	..	5305-252-2308	SCREW, HDLS, CONE POINT No. 5-44 NF-3, 3-16 LG MS51040-237 (96906)	ea	3	*	*	2	*	*	2	10	8	B18	4
P	F	..	5310-504-3949	NUT, ROUND W 1/8 TAP 5/16-24 NF-2, 1/4 THK 5043949 (19200)	ea	3	*	*	2	*	*	2	10	8	B18	5
P	F	..	5315-504-3948	PIN, HINGE 5/16-24 UNF-2A, 1-7/32 LG 5043948 (19200)	ea	3	*	*	2	*	*	2	10	8	B18	6
P	F	..	1290-613-7609	LEG ASSEMBLY, TRIPOD, LOWER 6137609 (19200)	ea	2	*	*	2	*	*	2	10	8	B18	7
P	F	..	1290-613-7610	LEG ASSEMBLY, TRIPOD UPPER 6137610 (19200)	ea	2	*	*	2	*	*	2	10	8	B18	8
				TRIPOD M5 ASSEMBLY															
X1	..	..	...	NUT, ROUND 5/16-24 NF-2 5043951 (19200)	ea	1	..	..	..	..	..	..	..	..	B19	1
X1	..	..	...	SCREW, CLAMPING 5043950 (19200)	ea	1	..	..	..	..	..	..	..	..	B19	2
P	F	..	1290-719-9614	HEAD, TRIPOD 7199614 (19200) (INITIALLY LISTED AS FIGURE B18, ITEM 3)	ea	1	..	..	..	..	..	..	..	..	B19	3
				SUPPORT ASSEMBLY															
P	F	..	...	SCREW, ROUND HEAD No. 6-40 UNF-2B MS35215-23 (19200)	ea	1	*	*	2	*	*	2	10	8	B20	1
X1	..	..	...	SOCKET, SPINDLE 7651748 (19200)	ea	1	..	..	..	..	..	..	..	..	B20	2
X1	..	..	...	SPINDLE 5031695 (19200)	ea	1	..	..	..	..	..	..	..	..	B20	3

Section IV. SPECIAL TOOLS, TEST AND SUPPORT EQUIPMENT

(1) SMR CODE (A) SOURCE	(B) MAINT	(C) RECOV	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION Reference Number & Mfr Code / Usable On Code	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (A) 1-20	(B) 21-50	(C) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (A) 1-20	(B) 21-50	(C) 51-100	(8) 1-YR ALW PER 100 EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATION (A) FIG. NO.	(B) ITEM NO.
X1	..	..	...	NUT, ROUND 5/16-24 NF-2 5043951 (19200)	ea	3	..	..	..	..	..	..	..	..	B20	4
X1	..	..	...	SCREW, CLAMPING 5043950 (19200)	ea	1	..	..	..	..	..	..	..	..	B20	5
X1	..	..	...	SUPPORT, TUBE 7651749 (19200)	ea	1	..	..	..	..	..	..	..	..	B20	6
X1	..	..	...	BEARING, SPINDLE 5043952 (19200)	ea	1	..	..	..	..	..	..	..	..	B20	7
				LEG ASSEMBLY												
X1	..	..	...	NUT, ROUND 5/16-24 NF-2 5043951 (19200)	ea	1	..	..	..	..	..	..	..	..	B21	1
X1	..	..	...	LEG, TRIPOD, LOWER 5043943 (19200)	ea	1	..	..	..	..	..	..	..	..	B21	2
X1	..	..	...	SCREW, CLAMPING 5043950 (19200)	ea	1	..	..	..	..	..	..	..	..	B21	3
X1	..	..	...	CLAMP, LEG 5043947 (19200)	ea	1	..	..	..	..	..	..	..	..	B21	4
P	F	..	5305-078-3661	SCREW, MACHINE FIL-HD No. 5-44-NF-3, 1-1/8 LG MS35199-32 (96906)	ea	3	*	*	2	*	*	2	10	8	B21	5
P	F	..	1290-504-3946	SHOE, LOWER LEG 5043946 (19200)	ea	3	*	*	2	*	*	2	10	8	B21	6
X1	..	..	...	COLLAR, LOWER LEG 5043945 (19200)	ea	1	..	..	..	..	..	..	..	..	B21	7
P	F	..	1290-613-7610	LEG ASSEMBLY, TRIPOD, UPPER 6137610 (19200) (INITIALLY LISTED AS FIGURE B18, ITEM 8)	ea	2	..	..	..	..	..	..	..	..	B21	8
P	F	..	5305-078-3660	SCREW, MACHINE FIL-HD, No. 5-44-NF-3, 7/8 LG MS35199-30 (96906)	ea	3	*	*	2	*	*	2	10	8	B21	9
X1	..	..	...	HINGE, TRIPOD, LEG 5043039 (19200)	ea	3	..	..	..	..	..	..	..	..	B21	10

				LIGHT, INSTRUMENT M2												
X1	..	..	...	SCREW, MACHINE RD. HD., BR, No. 2-64 NF-2, 1/8 LG MS35215-1 (19200)	ea	3	..	..	..	..	..	..	..	..	B22	1
X1	..	..	...	COVER, ASSEMBLY 6529318 (19200)	ea	1	..	..	..	..	..	..	..	..	B22	2
X1	..	..	...	CASE, ASSEMBLY 5570199 (19200)	ea	1	..	..	..	..	..	..	..	..	B22	3
X1	..	..	...	CAP, W/PINS (RIVETED) 5179397 (19200)	ea	1	..	..	..	..	..	..	..	..	B22	4
X1	..	..	...	SPRING, TENSION, CONICAL 0.071 DIA WIRE, 1-9/16 OD, 3-3/4 IN. COILS, 11/16 FREE LG 5048770 (19200)	ea	1	..	..	..	..	..	..	..	..	B22	5
P	F	..	6135-120-1020	BATTERY, DRY 1.5V, FL-SURF, TERM. CYL, 1-5/16 DIA, 2-3/8 H O/A, METALLIC OR NONMETALLIC OUTER COVERING, SALAMMONIAC PASTE TYPE ELECTROLYTE, TYPE BA-30 MIL-B-18 (80063)	ea	1	..	..	..	..	..	..	..	..	B22	6
X1	..	..	...	BRACKET, LAMP, ASSEMBLY 6138955 (19200)	ea	1	..	..	..	..	..	..	..	..	B22	7
X1	..	..	...	CABLE, LEAD, ASSEMBLY 42 IN. LG 6138957 (19200)	ea	1	..	..	..	..	..	..	..	..	B22	8
P	F	..	6240-635-9800	LAMP, INCANDESCENT 7.3V, 0.19 AMP, 1C-2R TUNG FIL, SPL BT-1-1/4 BULB, CLR, WHT, LT NO. 325 193145 (21450)	ea	2	..	..	..	..	..	..	..	..	B22	9
X1	..	..	...	CAP, HANDLIGHT 5179387	ea	1	..	..	..	..	..	..	..	..	B22	10
X1	..	..	...	CABLE, LEAD W/COVERING 42 IN. LG 6138911 (19200)	ea	1	..	..	..	..	..	..	..	..	B22	11

Section IV. SPECIAL TOOLS, TEST AND SUPPORT EQUIPMENT

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION Reference Number & Mfr Code / Usable On Code	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (A) 1-20	(B) 21-50	(C) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (A) 1-20	(B) 21-50	(C) 51-100	(8) 1-YR ALW PER 100 EQUIP CNT-GCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATION (A) FIG. NO.	(B) ITEM NO.
		SPECIAL TOOL LIST												
—HR—	1290-757-3291	COLLIMATOR 18-C-1279-50	ea	1	*	1	1	*	1	1	6	4	4-1	
—HR—	4931-536-5557	DIOPTOMETER 7680631	ea	1	*	1	1	*	1	1	6	4	4-2	
—HT—	4931-769-1596	FIXTURE, AZIMUTH, TESTING 7691596	ea	1	*	1	1	*	1	1	6	4	4-3	
—HR—	4931-612-1110	HOLDER, TELESCOPE, COLLIMATING 4-H-2374-125	ea	1	*	1	1	*	1	1	6	4	4-4	
—HR—	4931-554-9108	TELESCOPE, COLLIMATING 18-T-540-250	ea	1	*	1	1	*	1	1	6	4	4-5	
—HR—	4931-536-5555	TESTER, UNIVERSAL, VIBRATION 7560085	ea	1	*	1	1	*	1	1	6	4	4-6	
—H—	5120-757-5874	SCREWDRIVER special, off set, 3 in. lg	ea	1	*	1	1	*	1	1	8	6	4-7	
—H—	5120-595-8996	WRENCH, SPANNER, face 0.07 dia pin, No. 2	ea	1	*	1	1	*	1	1	8	6	4-7	
—H—	5120-345-1381	WRENCH, tubular, double and concave inserted blade size 0.500 and 0.516 in. (1/2 and 33/64 in.)	ea	1	*	1	1	*	1	1	8	6	4-7	
—H—	5120-345-1384	WRENCH, tubular size 0.594 and 0.609 in. (19/32 and 39/64 in.)	ea	1	*	1	1	*	1	1	8	6	4-7	
—H—	5120-345-1388	WRENCH, tubular size 0.719 and 0.734 in. (23/32 and 47/64 in.)	ea	1	*	1	1	*	1	1	8	6	4-7	
—H—	5120-345-1393	WRENCH, tubular size 0.906 and 0.922 in. (29/32 and 59/64 in.)	ea	1	*	1	1	*	1	1	8	6	4-7	

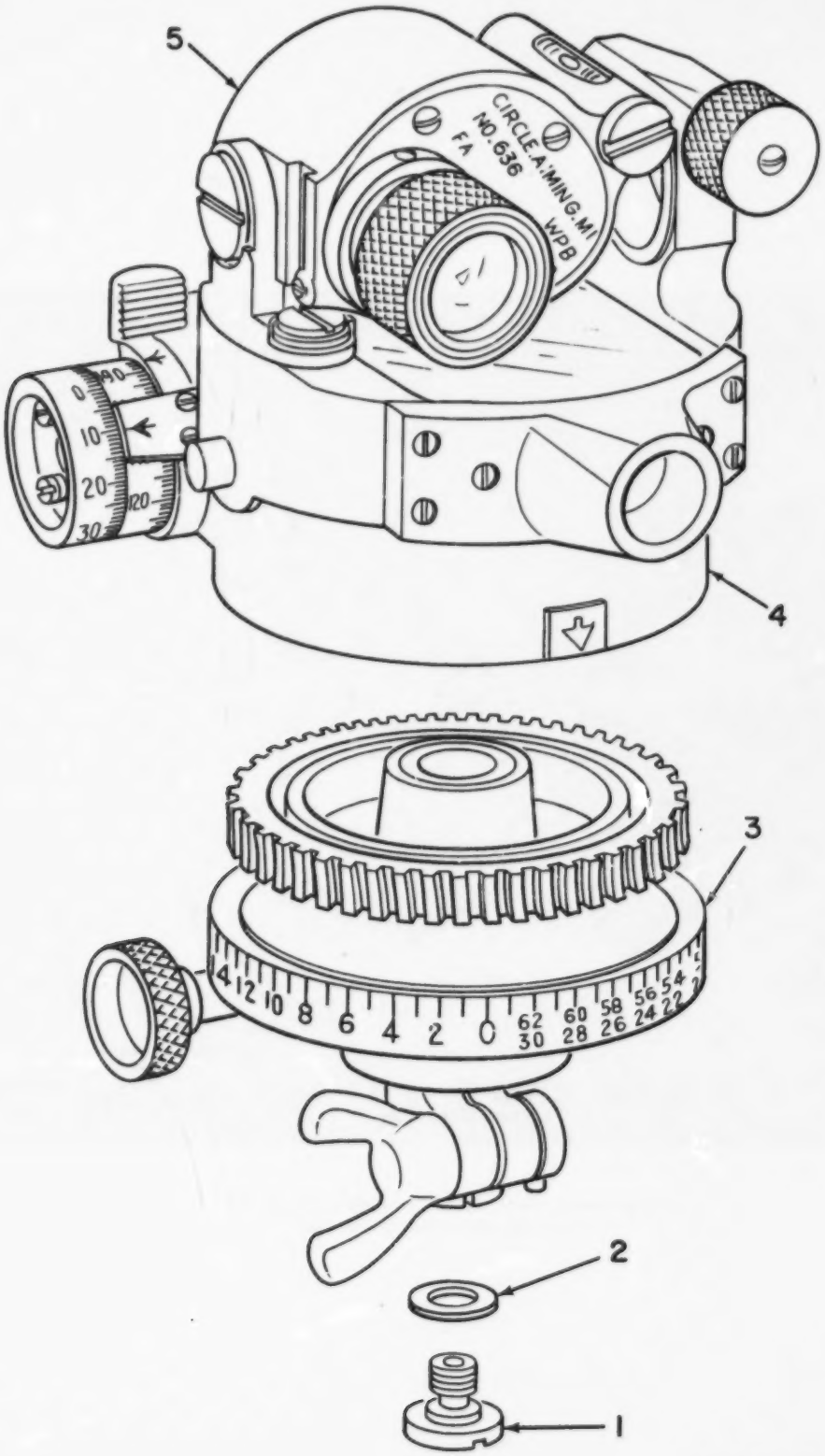

Figure B1. Aiming circle, M1 (azimuth and orienting mechanism)—partial exploded view.

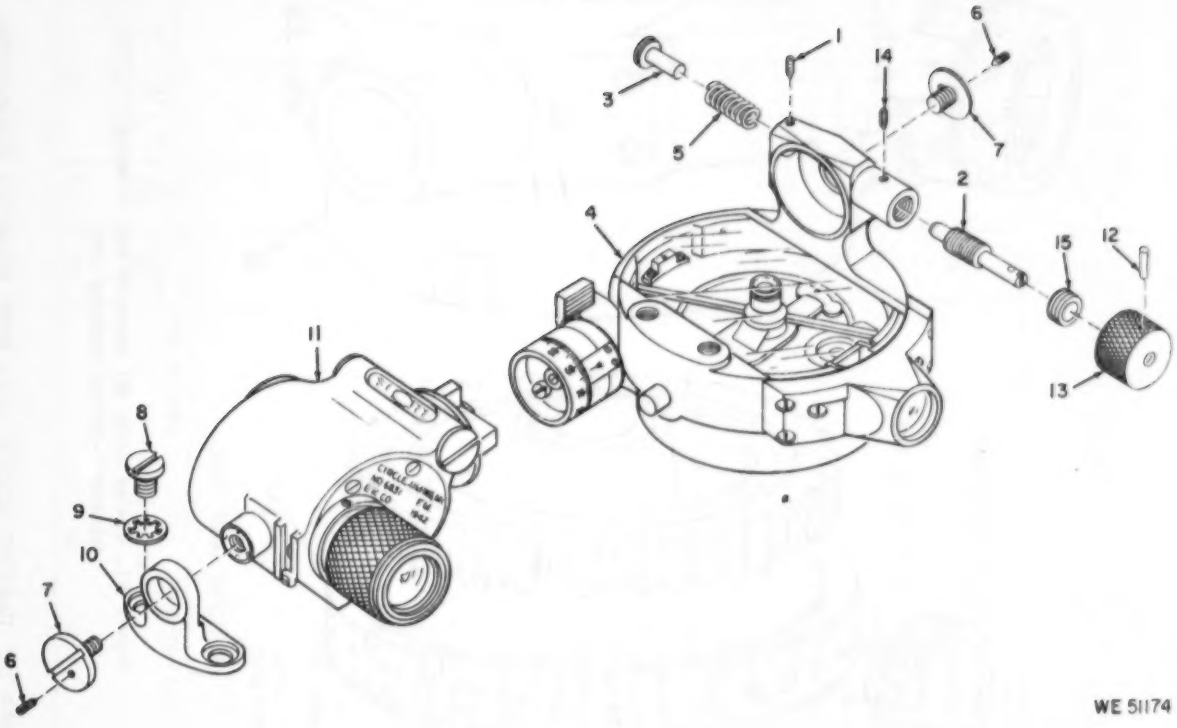

Figure B2. Telescope and main body assemblies—exploded view.

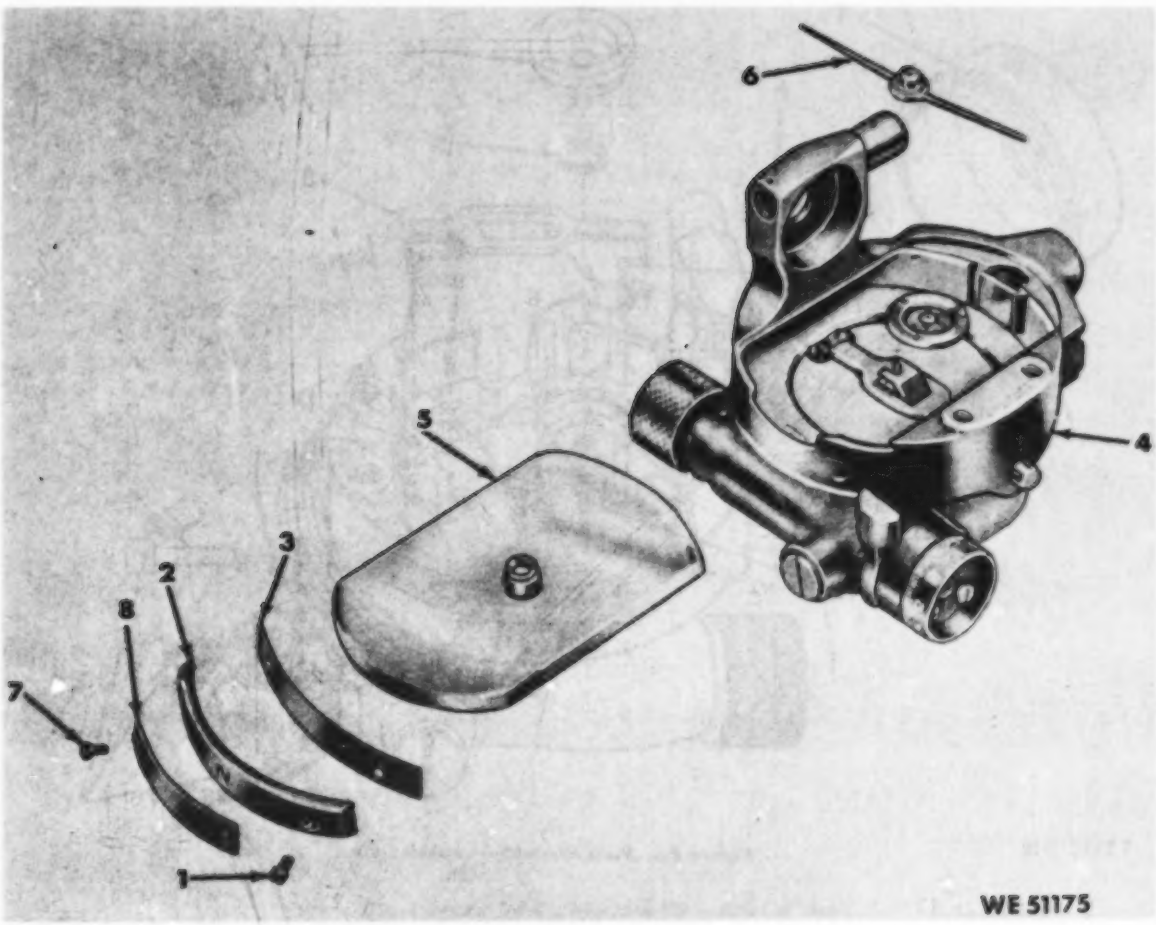

Figure B3. Magnetic needle, body assembly and associated parts—exploded view.

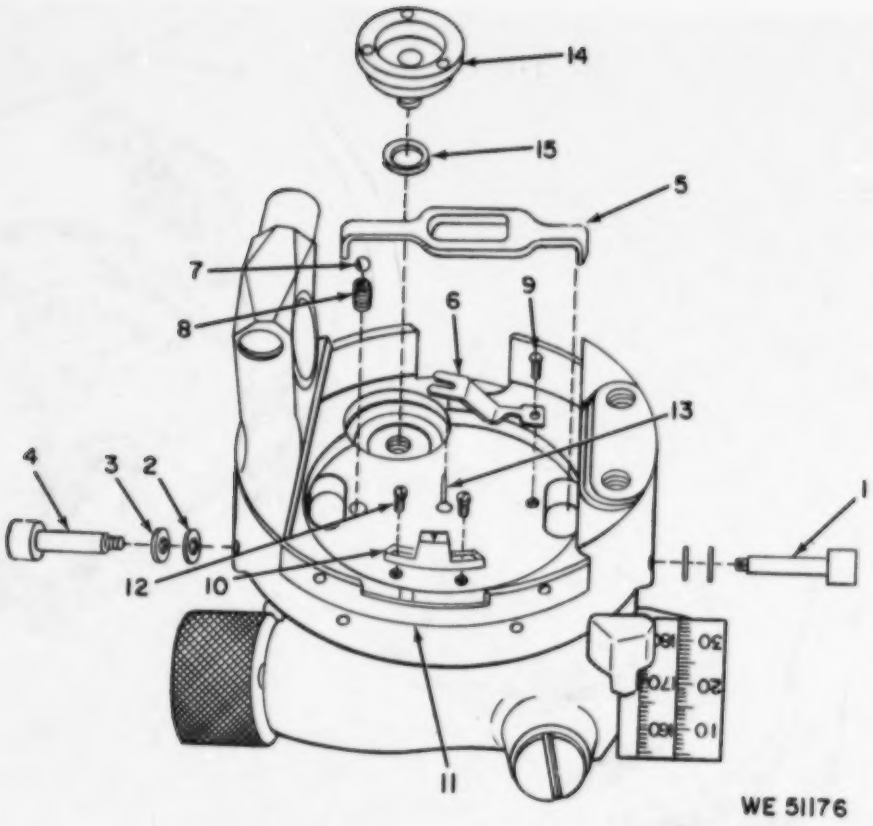

Figure B4. Body assembly—exploded view.

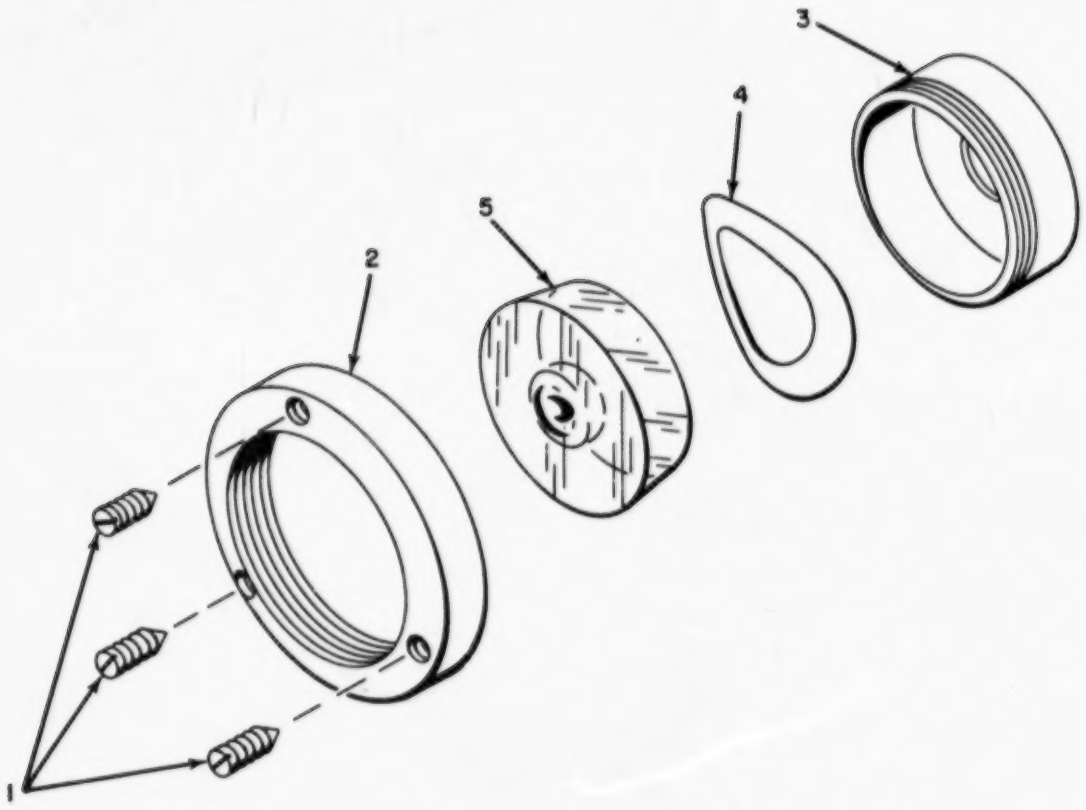

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Figure B5. Circular level vial assembly—exploded view.

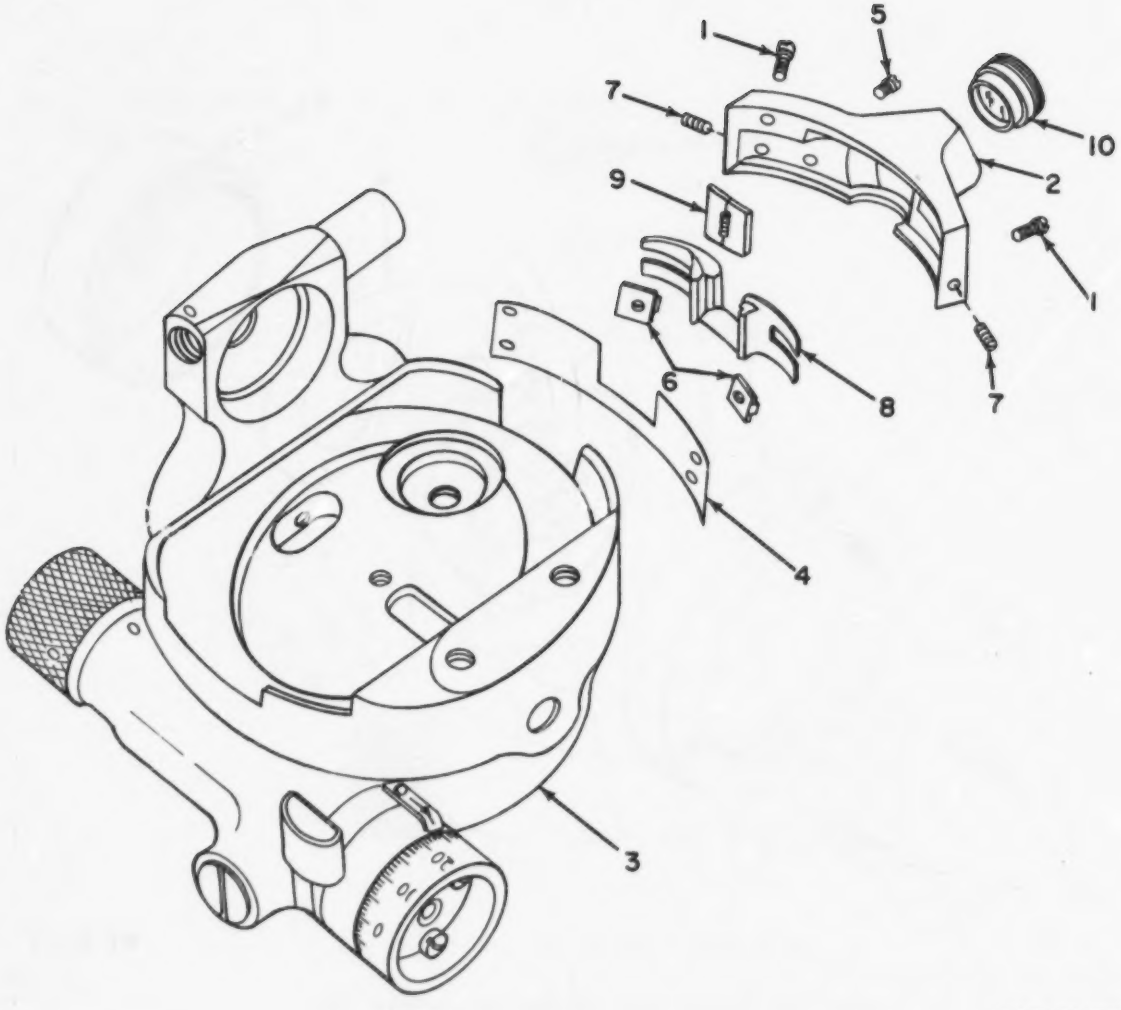

Figure B6. Magnetic needle magnifier assembly—partial exploded view.

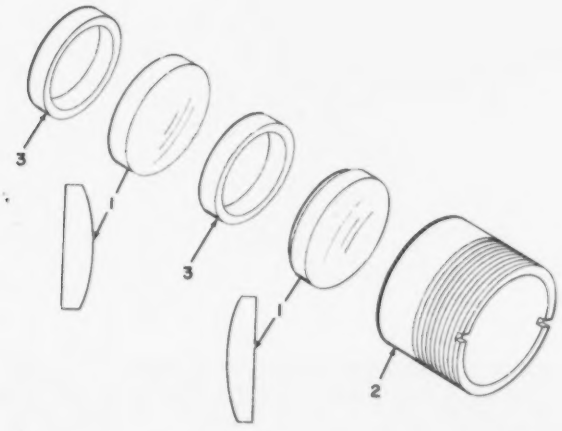

Figure B7. Magnetic needle magnifier assembly—partial exploded view.

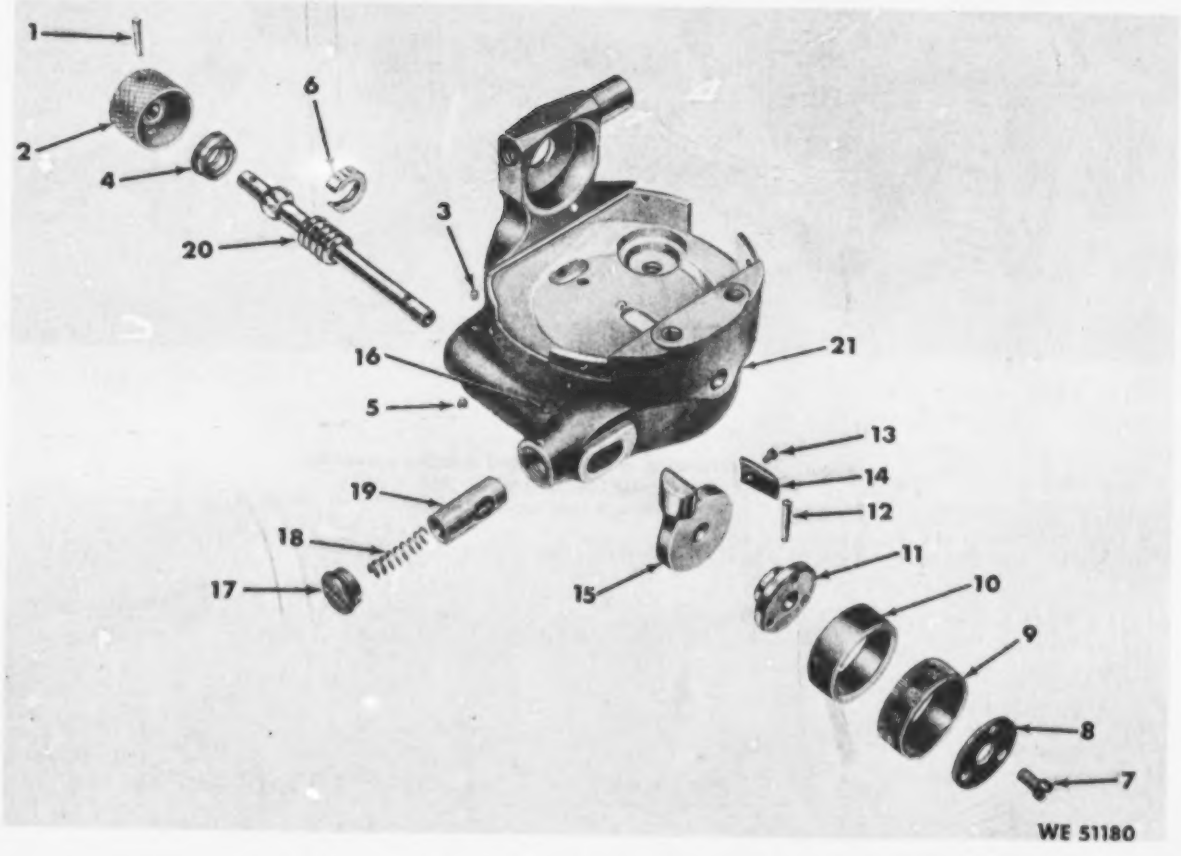

Figure B8. Azimuth worm mechanism—exploded view.

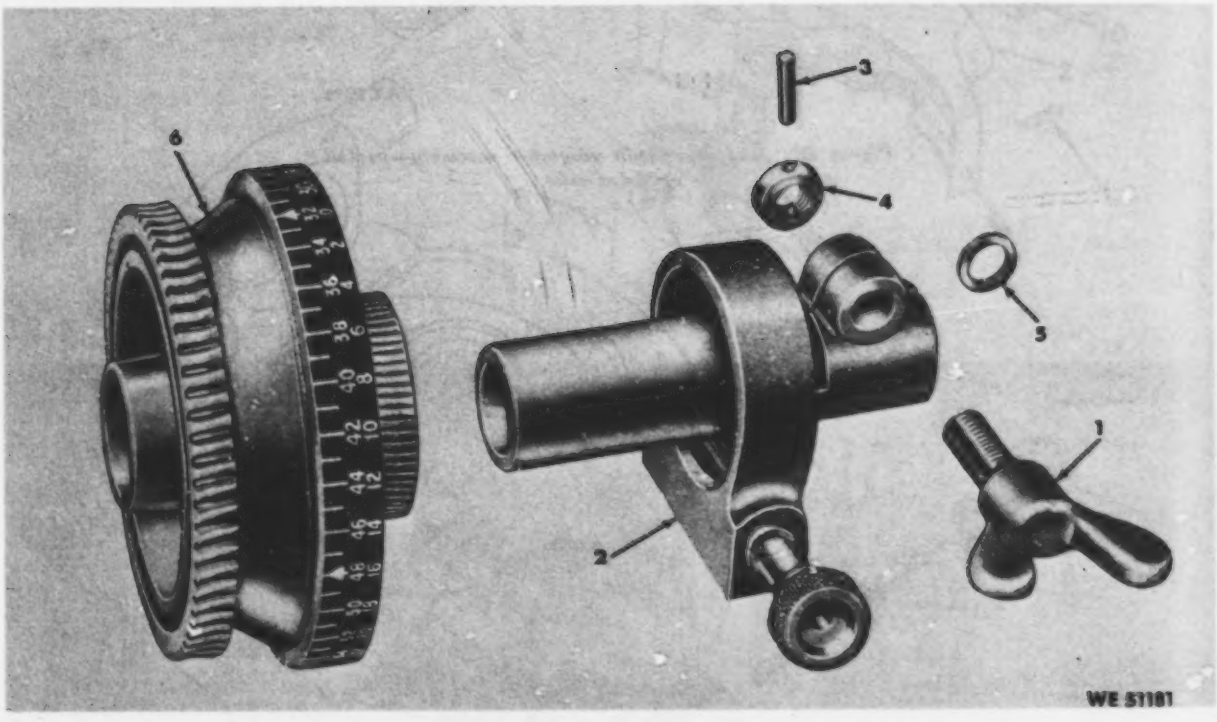

Figure B9. Orienting mechanism and housing assembly—partial exploded view.

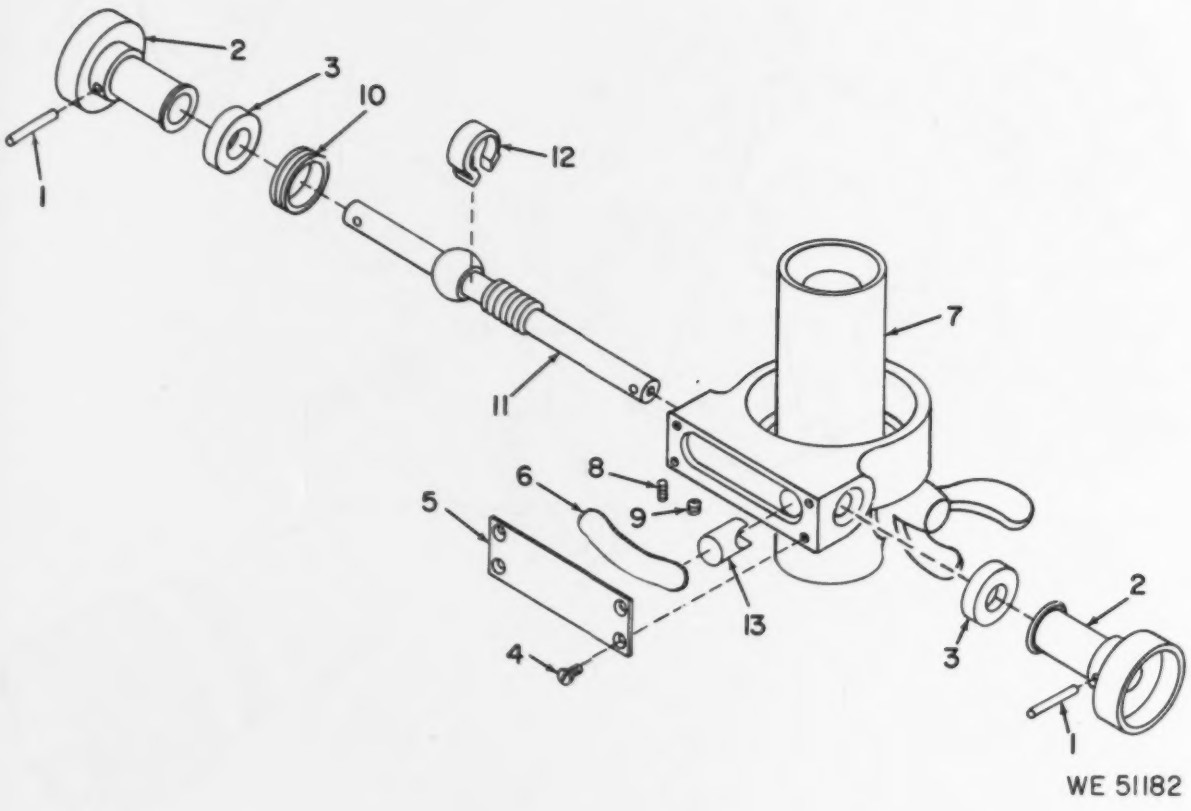

Figure B10. Orienting mechanism and housing assembly—partial exploded view.

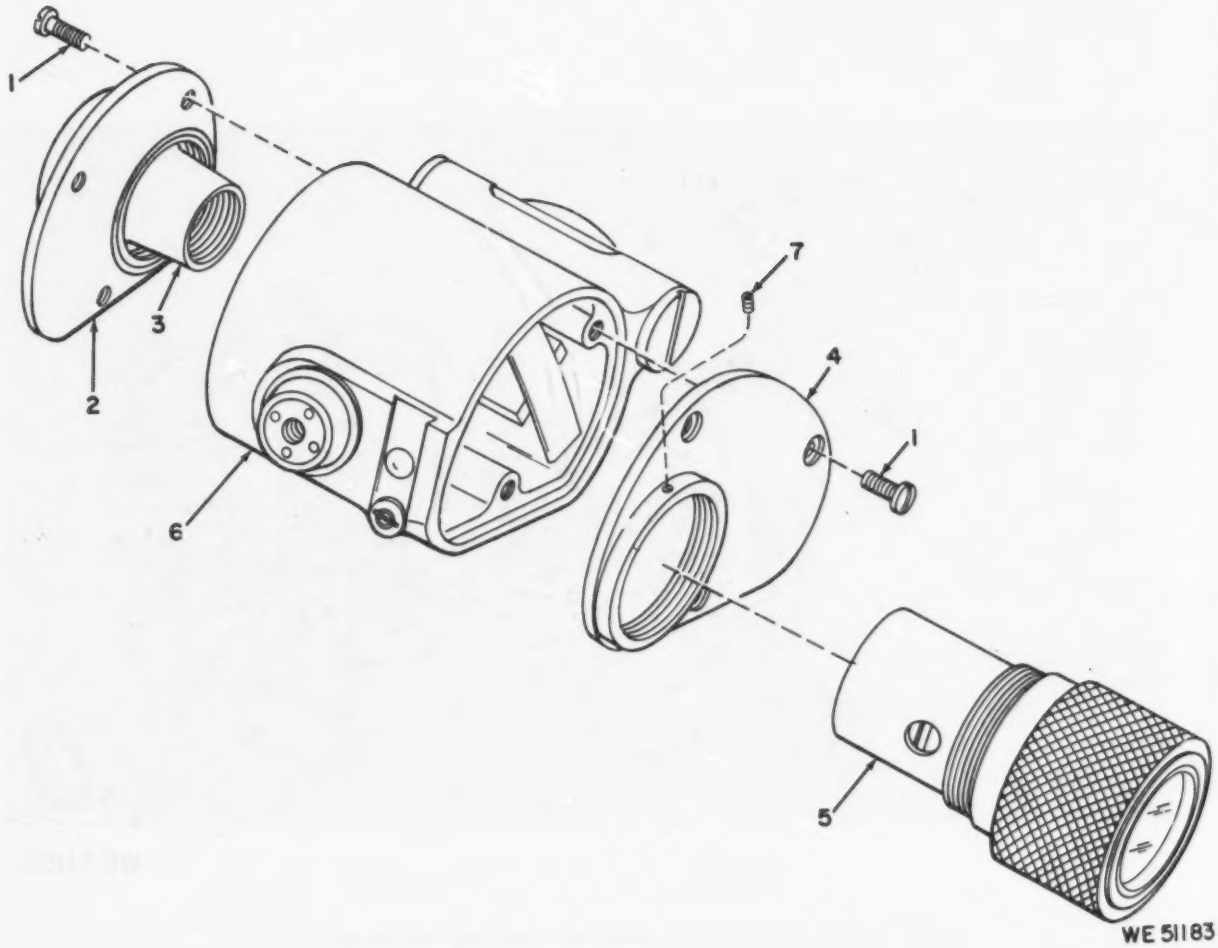

Figure B11. Telescope assembly—partial exploded view.

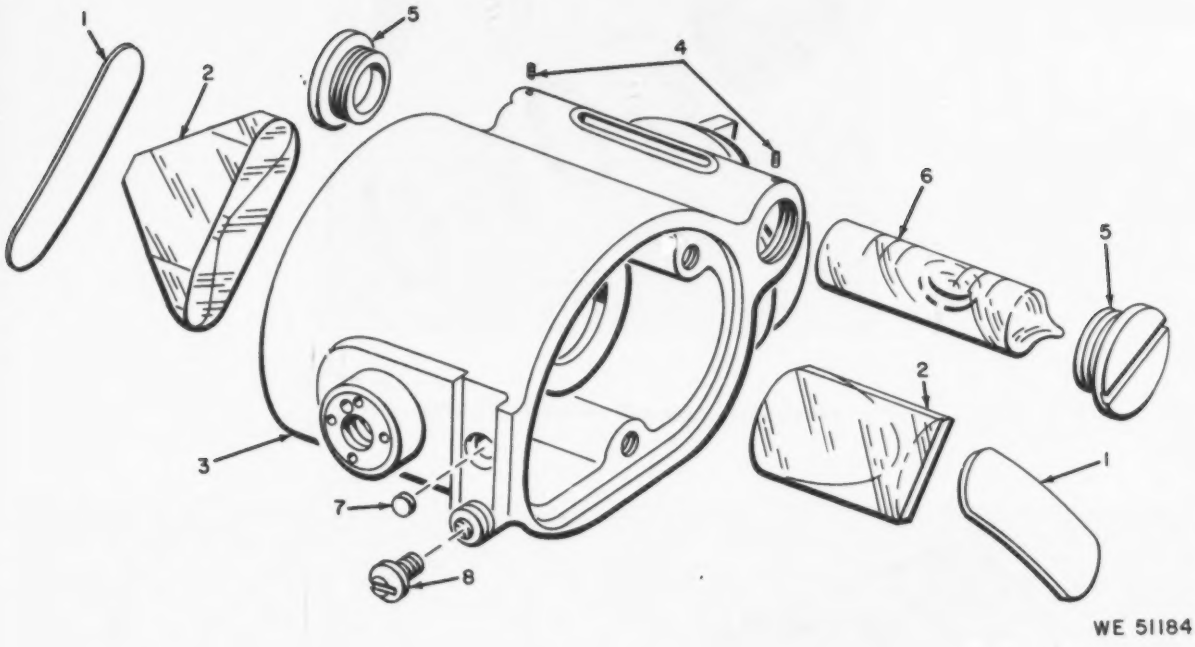

Figure B12. Telescope assembly—partial exploded view.

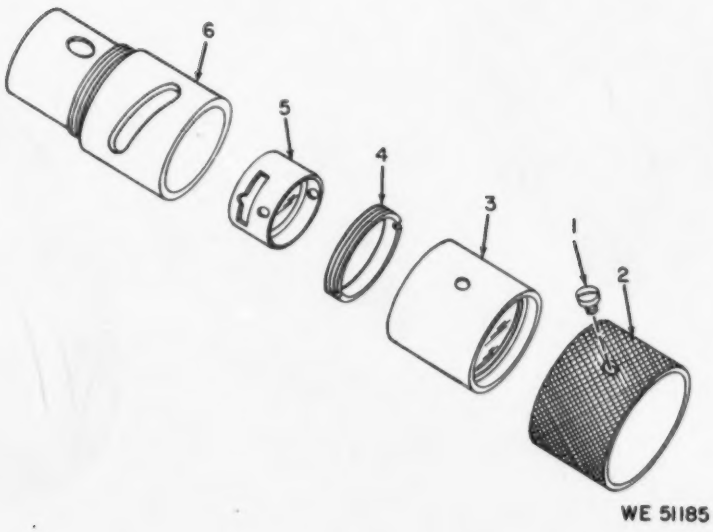

Figure B13. Eyepiece assembly—exploded view.

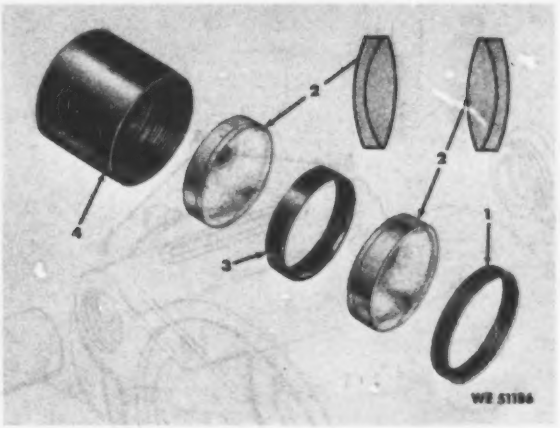

Figure B14. Lens cell assembly—exploded view.

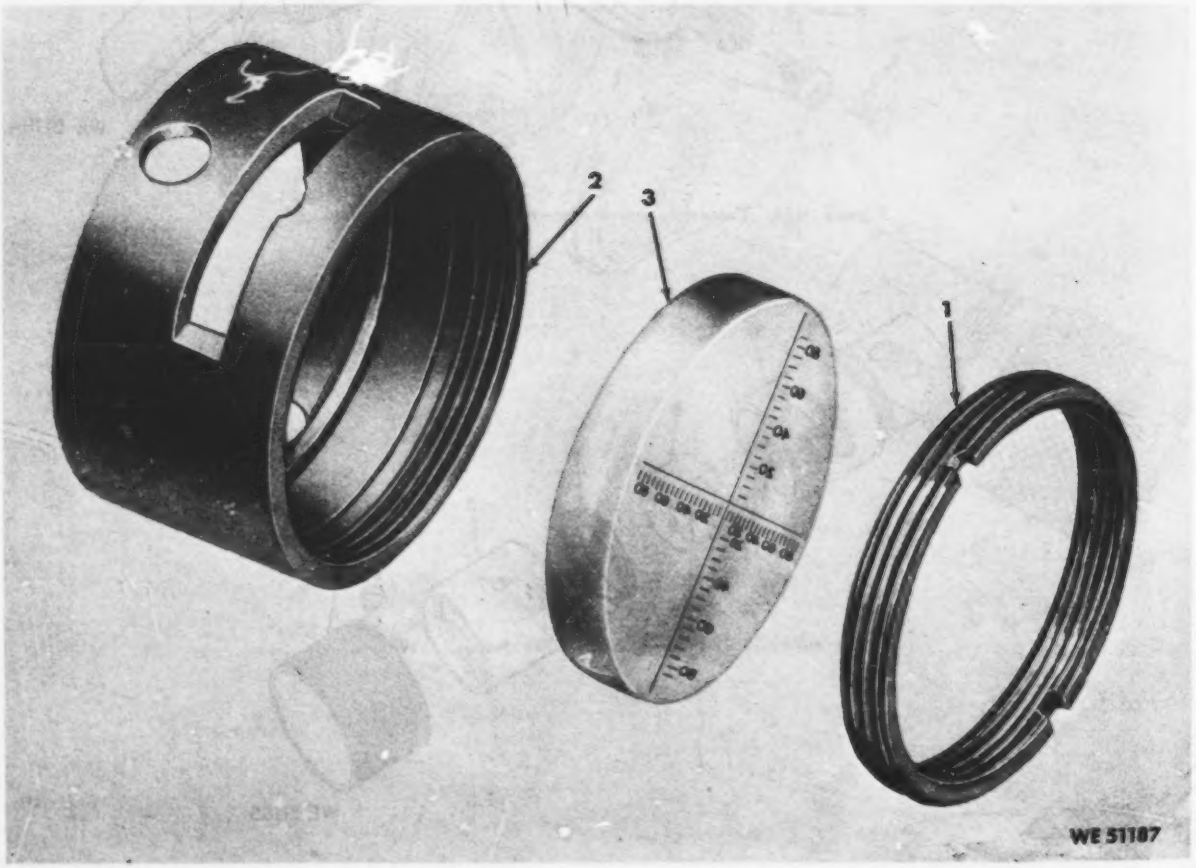

Figure B15. Reticle assembly—exploded view.

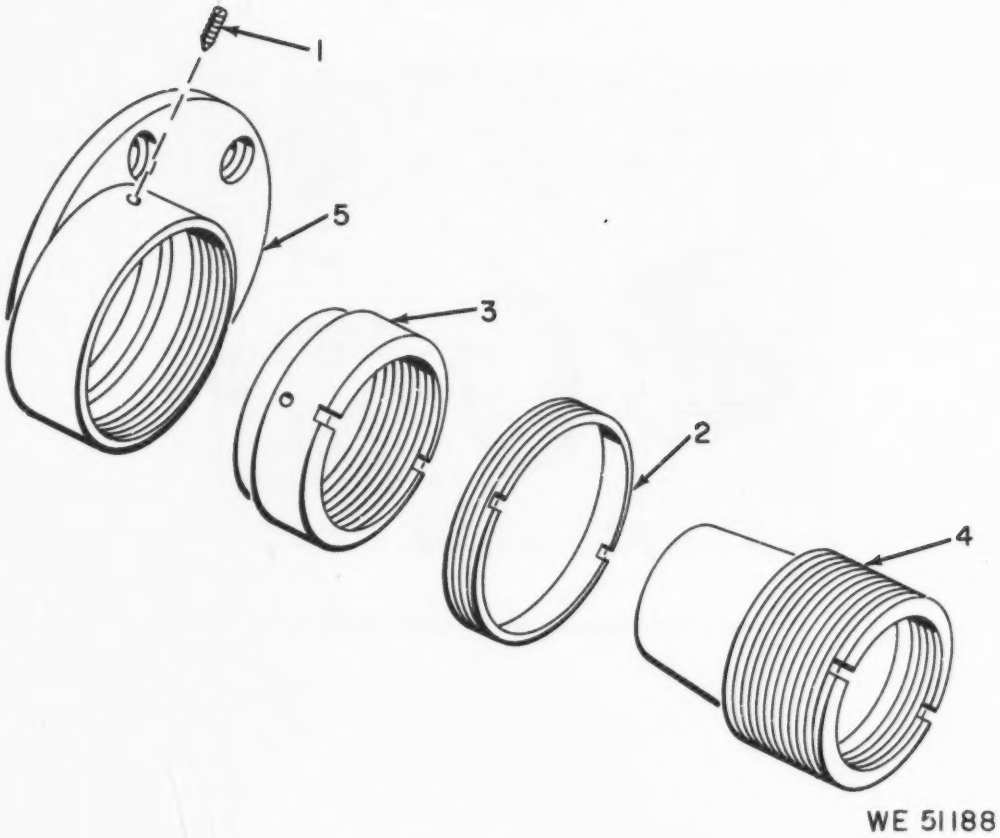

Figure B16. Objective assembly—exploded view.

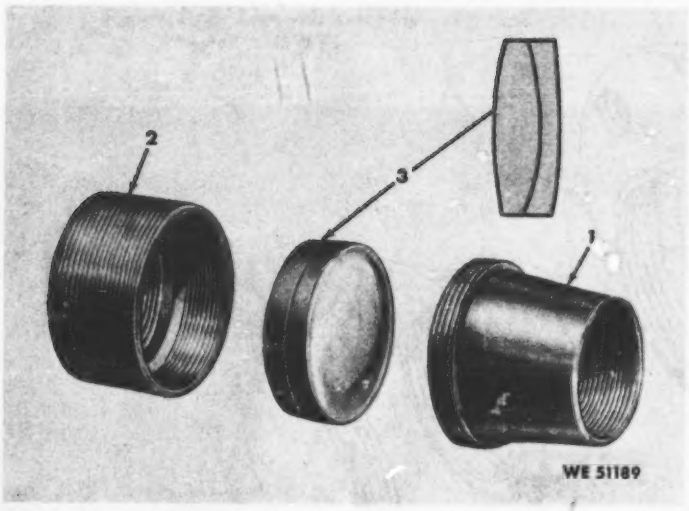

Figure B17. Objective cell assembly—exploded view.

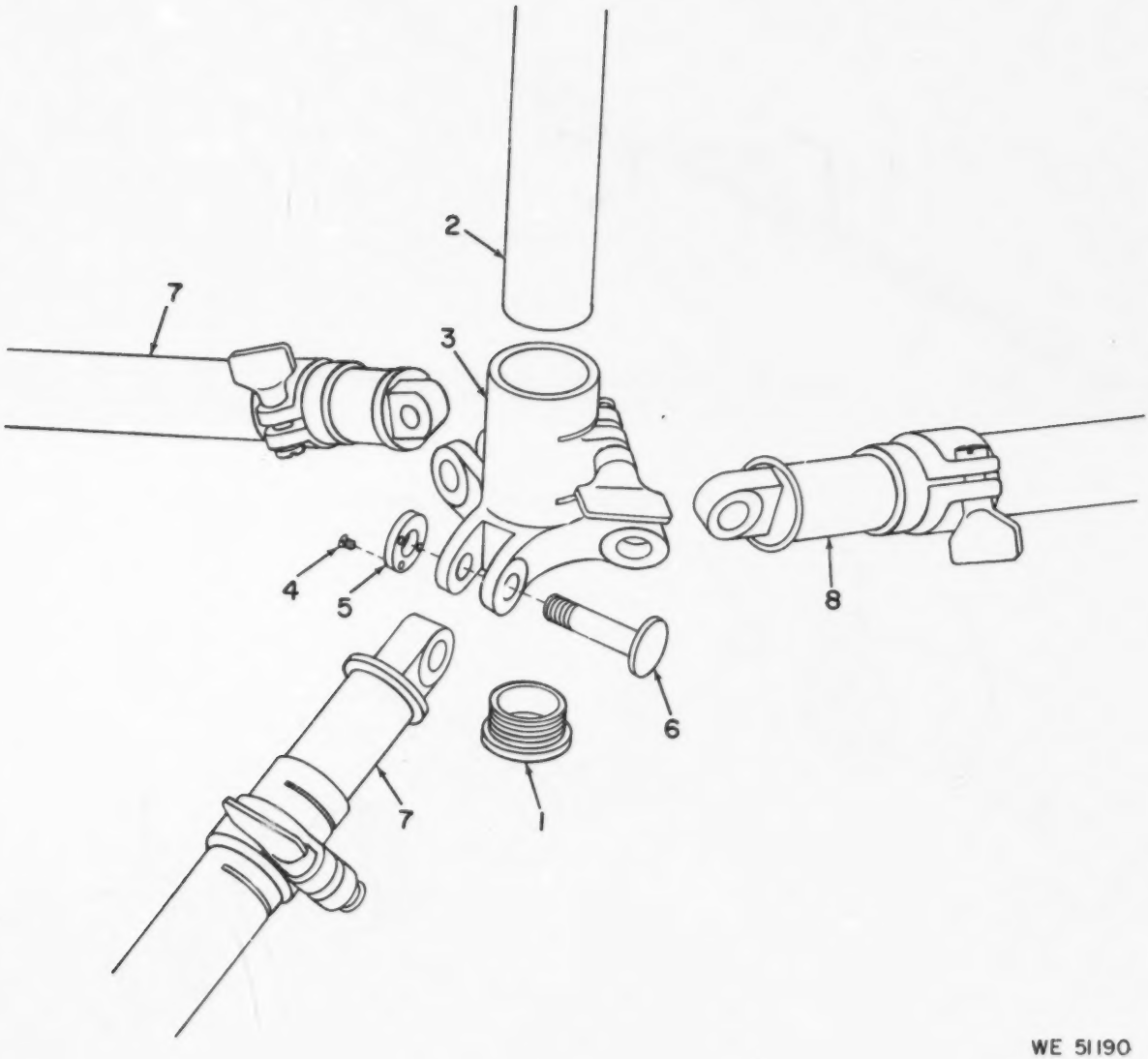

Figure B18. Tripod M5 assembly—partial exploded view.

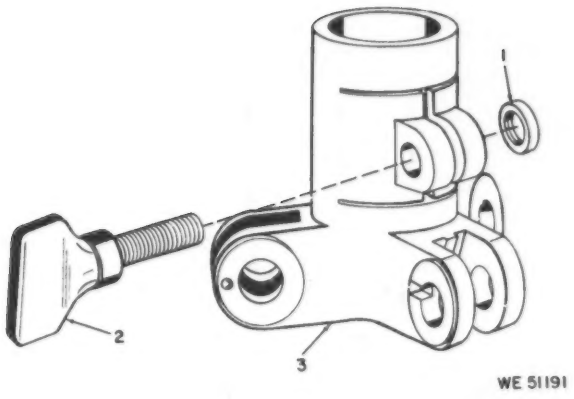

Figure B19. Tripod M5 assembly—partial exploded view.

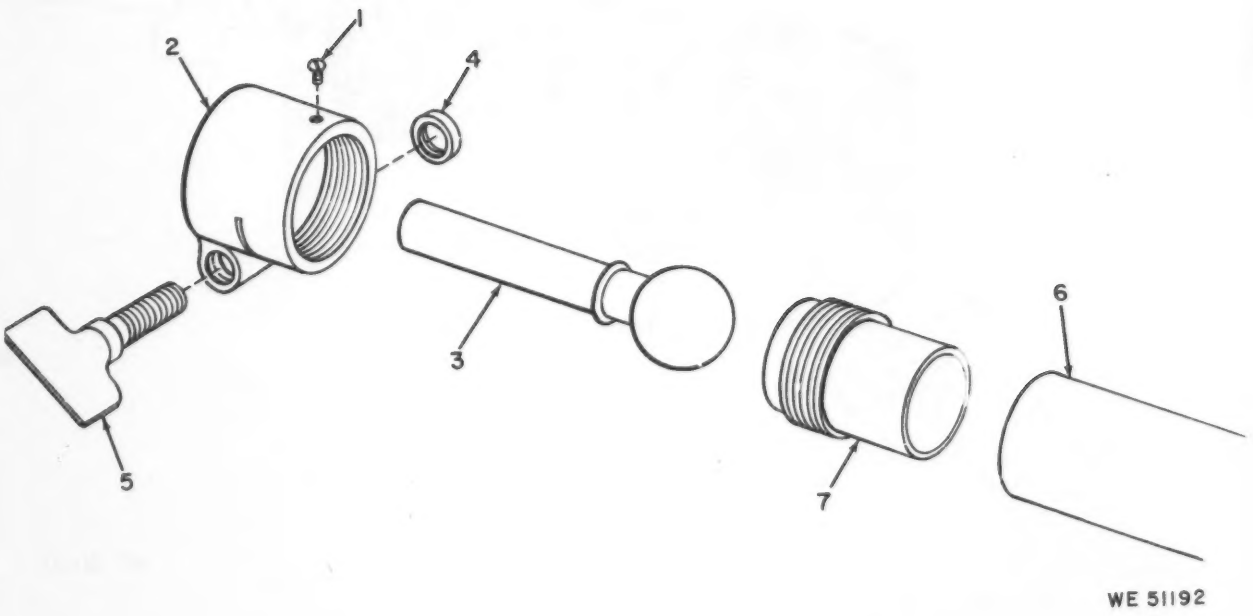

Figure B20. Support assembly and associated components.

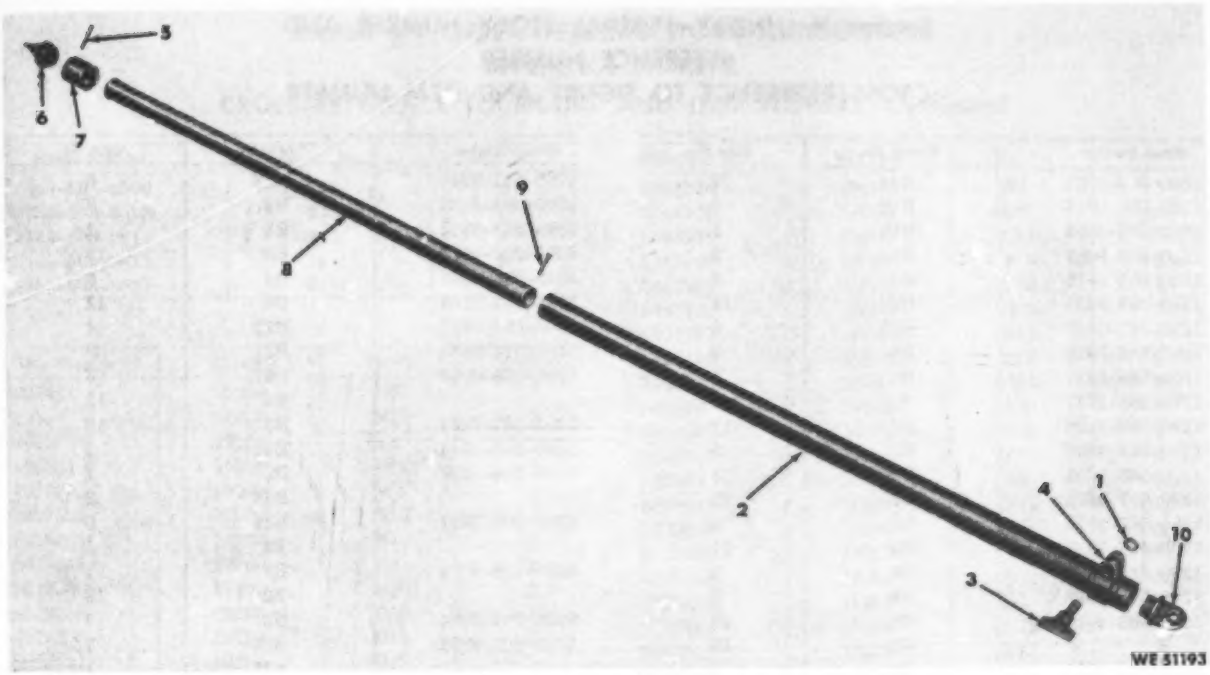

Figure B21. Leg assembly—exploded view.

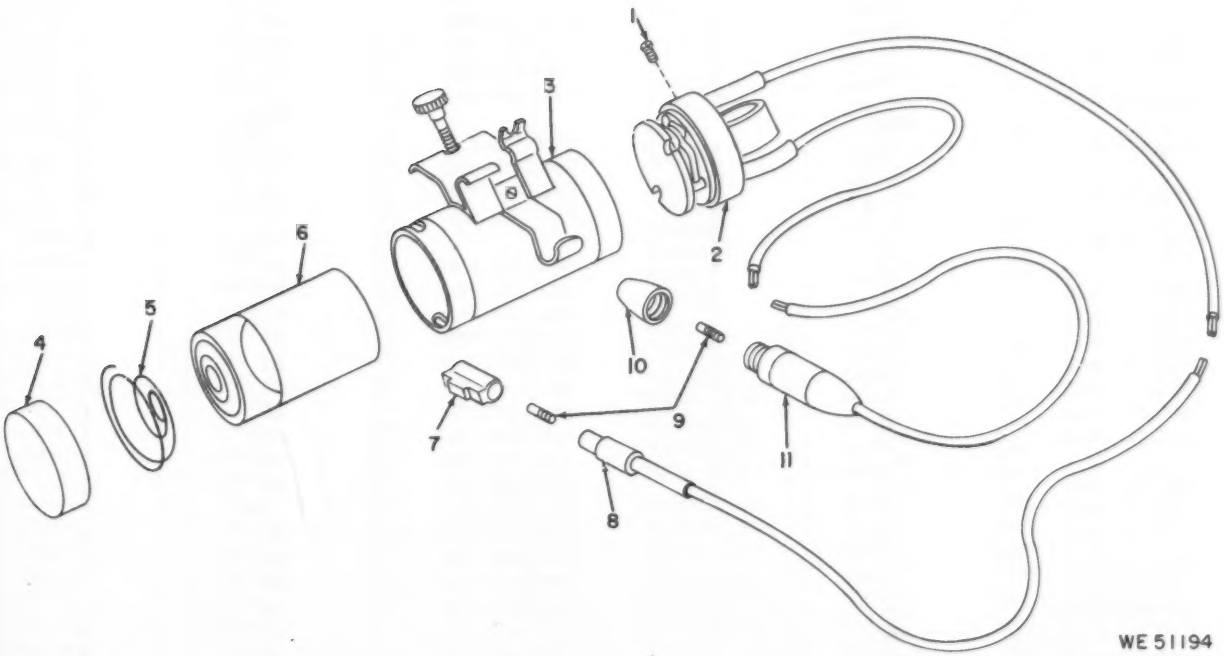

Figure B22. Instrument light M2—exploded view.

Section V. INDEX—FEDERAL STOCK NUMBER AND REFERENCE NUMBER CROSS-REFERENCE TO FIGURE AND ITEM NUMBER

Stock Number	Figure No.	Item No.
1240-503-1761	B14	2
1240-503-5616	B12	7
1240-503-6359	B17	3
1240-503-9629	B3	2
1240-503-9631	B3	8
1290-053-9628	B8	14
1290-067-6407	B12	6
1290-348-5936	B6	4
1290-348-5937	B3	3
1290-503-1677	B12	2
1290-503-9190	B4	13
1290-503-9595	B4	5
1290-503-9606	B10	13
1290-503-9608	B10	11
1290-503-9616	B9	4
1290-503-9619	B8	11
1290-503-9621	B8	9
1290-503-9622	B8	8
1290-503-9624	B8	19
	B2	12
1290-503-9632	B4	1
	B4	3
1290-503-9633	B6	9
	B3	2
1290-504-3887	B12	1
	B2	15
1290-504-3889	B2	10
1290-504-3921	B17	1
	B4	7
1290-504-3927	B6	6
	B20	1
1290-504-3928	B6	8
	B10	4
1290-504-3946	B21	6
	B20	7
1290-513-2032	B8	6
	B2	9
1290-573-2031	B10	12
	B18	4
1290-612-9648	B15	3
1290-612-9649	B8	15
1290-612-9650	B8	20
1290-612-9653	B3	6
1290-613-5660	B6	10
1290-613-7609	B18	7
1290-613-7610	B18	8
	B4	9
1290-517-7981	B12	8
1290-652-8560	1-1	--
1290-652-8676	1-1	--
1290-652-9317	1-1	--
1290-658-2649	1-1	--
1290-692-1515	B8	4
1290-692-1516	B8	6
1290-719-9614	B18	3
1290-758-6310	B4	4
1290-764-4665	B4	6
1290-765-0540	B3	5
3110-151-9157	B4	7
4730-541-0849	B12	5
5305-022-5415	B8	7
5305-050-3882	B3	1
5305-050-4029	B8	13
5305-050-4043	B6	5
5305-050-4188	B4	12
5305-054-0877	B12	4
5305-078-3660	B21	9
5305-078-3661	B21	5
	B8	12
5305-187-3254	B8	12
5305-206-1044	B11	1
5305-206-7326	B5	1
	B16	2
5305-206-7327	B10	9
	B8	1
5305-206-8732	B1	1
	B2	13
5305-207-7564	B2	7
5305-207-8852	B13	1
	B15	1
	B10	1
5305-252-2308	B18	4
5305-282-7643	B2	6
5305-282-7659	B2	14
5305-282-7675	B2	1
5305-282-9771	B9	1
5305-337-5831	B2	2
5305-543-4323	B6	1
5305-550-3844	B2	8
5305-582-9067	B8	3
5305-758-3596	B8	16
	B18	6
5305-758-4007	B8	5
5305-758-6059	B3	7
5305-801-7752	B8	13
5310-503-9612	B1	2
	B18	5
5310-503-9616	B9	4
5310-503-9617	B9	5
5310-504-3949	B18	5
5310-527-3288	B2	9
5310-758-7538	B4	2
5315-187-3226	B2	12
5315-187-3256	B8	1
5315-504-3948	B18	6
5330-297-0489	B4	3
5330-298-5472	B4	15
5330-641-0192	B10	3
5340-200-5376	B13	4
5340-201-1491	B8	18
5340-201-1492	B2	5
5340-201-1491	B8	18
5340-201-1492	B2	5
5340-201-1496	B4	8
5340-503-2984	B4	8
5340-503-9605	B10	6
5340-597-8829	B16	2
5340-597-8857	B15	2

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5355-503-9593	B13	2
5355-503-9610	B10	2
5355-503-9613	B8	2
5355-503-9627	B4	10

Reference No.	Mfg Code	Fig. No.	Item No.
225415	19200	B8	7
5031677	19200	B12	2
5032984	19200	B4	8
5035616	19200	B12	7
5036359	19200	B17	3
5037651	19200	B14	2
5039190	19200	B4	13
5039345	19200	B8	18
5039586	19200	B15	1
5039589	19200	B13	1
5039590	19200	B13	2
5039591	19200	B12	5
5039592	19200	B2	2
5039593	19200	B2	13
5039594	19200	B2	7
5039595	19200	B4	5
5039600	19200	B16	2
5039601	19200	B13	4
5039605	19200	B10	6
5039606	19200	B10	13
5039608	19200	B10	11
5039609	19200	B10	3
5039610	19200	B10	2
5039611	19200	B1	1
5039612	19200	B1	2
5039613	19200	B8	2
5039616	19200	B9	4
5039617	19200	B9	5
5039619	19200	B8	11
5039621	19200	B8	9
5039622	19200	B8	8
5039623	19200	B9	1
5039624	19200	B8	19
5039627	19200	B4	10
5039628	19200	B8	14
5039629	19200	B3	2
5039631	19200	B3	8
5039632	19200	B4	1
5039633	19200	B6	10
5039917	19200	B2	15
5039985	19200	B10	4
504029	19200	B8	13
504043	19200	B6	5
504188	19200	B4	12
5043887	19200	B12	1
5043889	19200	B2	10
5043921	19200	B17	1
5043923	19200	B2	5
5043926	19200	B5	1
5043927	19200	B6	6

Reference No.	Mfg Code	Fig. No.	Item No.
5043928	19200	B6	8
5043946	19200	B21	6
5043948	19200	B18	6
5043949	19200	B18	5
5043951	19200	B20	4
5043952	19200	B20	7
5177981	19200	B12	8
5183439	19200	B10	9
540827	19200	B12	4
540880	19200	B2	6
544098	19200	B10	1
5544750	19200	B1	3
589064	96906	B8	3
6129648	19200	B15	3
6129649	19200	B8	15
6129650	19200	B8	20
6129653	19200	B10	3
6135660	19200	B6	10
6137609	19200	B18	7
6137610	19200	B18	8
6528560	19200	1-1	--
6528676	19200	1-1	--
6529317	19200	1-1	--
6582649	19200	1-1	--
7199614	19200	B18	3
7583596	19200	B8	16
7584007	19200	B8	5
7586059	19200	B3	7
7586310	19200	B4	4
7586315	19200	B6	4
7586316	19200	B3	3
7587538	19200	B4	2
7587539	19200	B4	3
7591318	19200	B4	15
7596929	19200	B11	1
7596930	19200	B2	8
7644665	19200	B4	6
7650540	19200	B3	5
7680256	19200	B8	4
7680257	19200	B8	6
7680259	19200	B10	12
7680260	19200	B8	6
MS19062-3	96906	B4	7
MS24692-27	96906	B2	12
MS24692-78	96906	B8	12
MS24692-81	96906	B8	1
MS35102-3	96906	B12	6
MS35199-30	96906	B21	9
MS35199-32	96906	B21	5
MS35215-23	96906	B20	1
MS35234-3	96906	B6	1
MS35246-2	96906	B4	9
MS35333-22	96906	B2	9
MS51040-237	96906	B18	4
MS51056-2	96906	B2	1
MS51056-9	96906	B16	1
MS51056-022	96906	B3	1
MS51059-8	96906	B2	14

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APPENDIX C

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

C-1. General

This Maintenance Allocation Chart designates overall responsibility for the performance of maintenance functions on the identified end item or component. The implementation of field maintenance tasks upon this end item or compotent will be consistent with the assigned maintenance operations.

C-2. Maintenance Functions

Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine serviceability of an item by comparing its physical, mechanical and electrical characteristics with established standards.

b. Test. To verify serviceability and to detect electrical or mechanical failure by use of test equipment.

c. Service. To clean, to preserve and to lubricate. If it is desired that elements, such as painting and lubricating, be defined separately, they may be so listed.

d. Adjust. To rectify to the extent necessary to bring into proper operating range.

e. Align. To adjust specified variable elements of an item to bring to optimum performance.

f. Calibrate. To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared with the certified standard.

g. Install. To set up for use in an operational environment such as an emplacement, site, or vehicle.

h. Replace. To replace unserviceable items with serviceable like items.

i. Repair. Those maintenance operations necessary to restore an item to serviceable condition through correction of material damage or a specific failure. Repair may be accomplished at each category of maintenance.

j. Overhaul. Normally, the highest degree of maintenance performed by the Army in order to minimize time work in process is consistent with quality and economy of operation. It consists of that maintenance necessary to restore an item to completely serviceable condition as prescribed by maintenance standards in technical publications for each item of equipment. Overhaul normally does not return an item to like new, zero mileage, or zero hour condition.

k. Rebuild. The highest degree of materiel maintenance. It consists of restoring equipment as nearly as possible to new condition in accordance with original manufacturing standards. Rebuild is performed only when required by operational considerations or other paramount factors and then only at the depot maintenance category. Rebuild reduces to zero the hours or miles the equipment, or component thereof, has been in use.

l. Symbols. The uppercase letter placed in the appropriate column indicates the lowest level at which that particular maintenance function is to be performed.

C-3. Explanation of Columns

Listed below is an explanation of the columns shown in the maintenance allocation chart:

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies and modules with the next higher assembly.

b. Column 2, Functional Group. Column 2 lists the noun names of components, assemblies, sub-

assemblies and modules on which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the lowest level at which that particular maintenance function is to be performed.

d. Column 4, Tools and Equipment. This column shall be used to specify, by code, those tools and test equipment required to perform the designated function.

e. Column 5, Remarks. Self-explanatory.

Section II. MAINTENANCE ASSIGNMENT

(1) GROUP NO.	(2) FUNCTIONAL GROUP	(3) MAINTENANCE FUNCTION											(4) TOOLS AND EQUIPMENT	(5) REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1.0	Azimuth Mechanism Assembly	C	--	C	O	--	--	--	--	F	H	--	1 to 6 incl.	See section III
1.1	Telescope Assembly	C	--	C	F	H	--	--	--	F	D	--		
2.0	Orienting Assembly	C	--	C	--	--	--	--	--	F	H	--		
3.0	Tripod, M5	C	--	C	C	--	--	C	C	O	F	--		

LEGEND:
C–Operator/crew
O–Organizational maintenance
F–Direct support maintenance
H–General support maintenance
D–Depot maintenance

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOL OR TEST EQUIPMENT REFERENCE CODE	MAINTENANCE CATEGORY	NOMENCLATURE	FSN	TOOL AND NUMBE
1	H	COLLIMATOR 18-C-1279-50	1290-757-3291	
2	H	DIOPTOMETER 7680631	4931-536-5557	
3	H	FIXTURE, azimuth testing 7691596	4931-769-1596	
4	H	HOLDER, telescope, collimating 4-H-2374-125	4931-612-1110	
5	H	TELESCOPE, collimating 18-T-540-250	4931-554-9108	
6	H	TESTER, universal vibration 7560085	4931-536-5555	

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